LAMPIRAN

No	Parameter	Alat dan Bahan	Prosedur Penelitian
1	Amonium	• Spektrofotometer type DR-5000 HACH/ UV-Vis spektrofotometer type DR-5000 HACH • labu Kjeldahl 500 mL; • pipet mikro 100, 250, 500 dan 1000 µL; • labu ukur 500 dan 1000 mL; • gelas ukur 100 mL; • pipet ukur 10 mL; • labu erlenmeyer 100 dan 250 mL; • gelas piala 100 mL.	a. cara pengukuran kadar nitrogen-orgarnik dihitung sebagai amonium-N yang terdapat dalam air antara 0,02- 5,00 mg/L NH_4-N; b. penggunaan metode makro Kjeldahl dengan alat spektrofotometer pada kisaran panjang gelombang 400-500 nm.

2	Indeks volume lumpur	a. Tabung Imhoff (*Imhoff cone*). b. *Stopwatch* c. Termometer	1. Masukan 1 liter contoh / sample ke dalam tabung Imhoff. 2. jalankan stopwacth. Catat perolehan volume lumpur yang terkumpul didasar tabung Imhoff setiap 5, 10, 15, 20, 30, 45 dan 60 menit.
3.	Phospat	▪ Air suling. ▪ Culvet ▪ Amino Acid 1934-32 ▪ Molybdovandate 20760 ▪ gelas ukur; ▪ Sampel air 100 ml ▪ Spektrofotometer type type DR-5000 HACH	1. Set program 501 (layer akan menunjukan Dial nm TO 890) 2. Putar panjang gelombang ke 890 nm 3. Tekan READ/ENTER (layer akan menunjukan mg/l PO_4^{3-}) 4. Masukan contoh ke cuvet 5. Masukan phospofer 3 phosphate powder ke cuvet (sampel akan berwarna biru bening) 6. Tekan SHIFT Timer 7 (2 menit) 7. Ketika tanda peringatan berbunyi masukan cuvet blanko 8. Tekan ZERO hingga muncul 0,00 mg/l PO_4^{3-} FV 9. Segera masukan cuvet sampel, tidak boleh lebih dari 3 menit sejak tanda peringatan berbunyi 10. Tekan READ/ENTER, baca

			hasil yang tertera di Dial
4.	DO	• DO meter yang telah dikalibrasi, • botol KOB, • pengaduk magnit yang dilengkapi pengatur kecepatan putar tetap dan waktu.	1. penyediaan contoh uji yang telah diambil sesuai dengan metode pengambilan contoh uji kualitas air, 2. isi botol KOB dengan contoh uji secara duplo sampai penuh biarkan terjadi turbulensi, 3. benda uji siap diuji. 4. hidupkan alat DO meter atur alat DO meter untuk mengukur suhu udara 5. baca dan catat suhu udara 6. atur alat DO meter untuk mengukur oksigen terlarut atur DO meter sehingga menununjukkan kadar oksigen diudara. 7. masukkan magnit kedalam botol KOB, 8. aduk benda uji dengan pengaduk magnit, 9. catat skala yang ditunjuk pada skala alat sebagai kadar DO dalam mg/L.
5.	TSS	▪ Kertas saring (glass-fiber filter) dengan beberapa jenis: ▪ Air suling. ▪ desikator yang berisi silika gel;	1. Gunakan wadah gelas atau botol plastik polietilen atau yang setara. 2. Awetkan contoh uji pada suhu 4°C, untuk meminimalkan dekomposisi mikrobiologikal

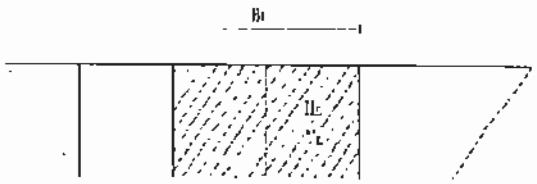
		▪ oven, untuk pengoperasian pada suhu 103°C sampai dengan 105°C; ▪ timbangan analitik dengan ketelitian 0,1 mg; ▪ pengaduk magnetik; ▪ pipet volum; ▪ gelas ukur; ▪ cawan aluminium; ▪ cawan porselen/cawan Gooch; ▪ penjepit; ▪ kaca arloji; ▪ pompa vacum.	terhadap padatan. 3. Contoh uji sebaiknya disimpan tidak lebih dari 24 jam. 4. Letakkan kertas saring pada peralatan filtrasi. Pasang vakum dan wadah pencuci dengan air suling berlebih 20 mL. Lanjutkan penyedotan untuk menghilangkan semua sisa air, matikan vakum, dan hentikan pencucian. 5. Pindahkan kertas saring dari peralatan filtrasi ke wadah timbang aluminium. Jika digunakan cawan Gooch dapat langsung dikeringkan. 6. Keringkan dalam oven pada suhu 103°C sampai dengan 105°C selama 1 jam, dinginkan dalam desikator kemudian timbang. 7. Ulangi langkah pada butir c) sampai diperoleh berat konstan atau sampai perubahan berat lebih kecil dari 4% terhadap penimbangan sebelumnya atau lebih kecil dari 0,5 mg. 8. Lakukan penyaringan dengan peralatan vakum. Basahi

			saringan dengan sedikit air suling. 9. Aduk contoh uji dengan pengaduk magnetik untuk memperoleh contoh uji yang lebih homogen. 10. Pipet contoh uji dengan volume tertentu, pada waktu contoh diaduk dengan pengaduk magnetik 11. Cuci kertas saring atau saringan dengan 3 x 10 mL air suling, biarkan kering sempurna, dan lanjutkan penyaringan dengan vakum selama 3 menit agar diperoleh penyaringan sempurna. Contoh uji dengan padatan terlarut yang tinggi memerlukan pencucian tambahan. 12. Pindahkan kertas saring secara hati-hati dari peralatan penyaring dan pindahkan ke wadah timbang aluminium sebagai penyangga. Jika digunakan cawan Gooch pindahkan cawan dari rangkaian alatnya. 13. Keringkan dalam oven setidaknya selama 1 jam pada

			suhu 103°C sampai dengan 105°C, dinginkan dalam desikator untuk menyeimbangkan suhu dan timbang. 14. Ulangi tahapan pengeringan, pendinginan dalam desikator, dan lakukan penimbangan sampai diperoleh berat konstan atau sampai perubahan berat lebih kecil dari 4% terhadap penimbangan sebelumnya atau lebih kecil dari 0,5 mg.

Tabel. 2. Prosedur Pengukuran Debit

No	Kegiatan	Alat dan Perlengkapan	Prosedur Pelaksanaan
1	Pengukuran Debit	• Current meter dan perlengkapan nya • Pita ukur atau meteran • Alat tulis • Stop watch	1. Menentukan penampang sungai di bagian sungai yang lurus dan mempunyai aliran sejajar. 2. Menentukan satu penampang sungai dibagian sungai yang lurus dan mempunyai aliran sejajar dengan interval sebesar ¼ lebar sungai. 3. Kecepatan aliran penampang tersebut diukur dengan alat ukur kecepatan current meter. 4. Jika kedalaman air (H) lebih dari 1 meter, alat ukur di tempatkan pada dua titik, masing-masing 0,2 H dan 0,8 H, dan hasil pengukurannya adalah : $V = \frac{1}{2}(V_{0,2} + V_{0,8})$ Atau pada 3 titik masing-masing pada 0,2 H, 0,6 H dan 0,8 H dan hasil pengukuran adalah : $V = \frac{1}{3}(V_{0,2} + V_{0,6} + V_{0,8})$ Tetapi jika kedalaman air (H) kurang dari 20 cm maka alat ukut hanya ditempatkan pada titik 0,2 H. 5. Kedalaman sungai menurut penampang diukur dengan meteran. 6. Hitung debit pada masing-masing penampang dihitung dengan menggunakan metode "*mean area methode*" atau "*mid area methode*".



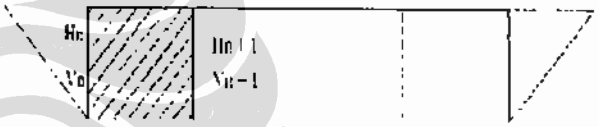
Persamaan debit menjadi sebagai berikut :

$$Qn = Hn\ Bn\ Vn$$

$$n = 1,.....n$$

$$Qp = \Sigma\ qn$$

a. Mid area method



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Persamaan debit menjadi sebagai berikut :

$$Qn = \frac{1}{2}(H_n + H_{n+1})(V_n + V_{n+1}).\frac{1}{2}B$$

b. Untuk perbandingan debit di salah satu potongan melintang (Qp) dapat dihitung dengan rumus :

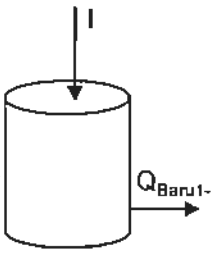
$$Qp = Ap * Vp$$

$$V_p = \frac{V_{t1} + V_{t2} + ... + V_{tn}}{N}$$

Dimana :

			Qp = debit sungai pada potongan melintang Ap = luas penampang basah sungai pada potongan melintang Vp= kecepatan aliran sungai pada potongan melintang

PO4 - 1



C1 9.23
C2 12.32

Danau	C_s (t)	W_i	Q_i m^3/hari	V m^3	H m	A m^2	vs m/h	k hari	λ_i $hari^{-1}$
S. Baru1	9.2	0	12092.29	10000	2	5000	0.01	0.1	1.29

initial condition

t = 0

$c(t) = c_{dansi}$ g/m^3

$c_1(t) = 9.2$ g/m^3

$c_1(t + = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -$

$k_{21} = f(t+ 1/2\Delta t, c(t)+1 = - (t + 1/2 \Delta t\ k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1 = - (t + 1/2 \Delta t\ k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_3 = - (t + \Delta t\ k_{31})$

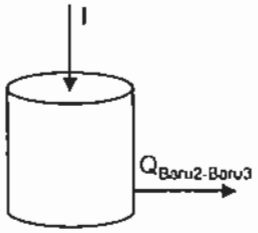
dt = 0.5 hr

t = 0

$c_1(t)$ = 9.2

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	9.23													9.23
0.5		0.00	9.23	-11.88	0.25	6.26	-8.06	0.25	7.22	-9.29	0.50	4.59	-5.90	4.86
(t + Δt)	4.86													
1.000		0.50	4.86	-6.25	0.75	1.73	-2.23	0.75	4.30	-5.54	1.00	2.09	-2.69	2.82
(t + Δt)	3.02													
1.5000		1.00	3.02	-3.88	1.25	2.05	-2.63	1.25	2.36	-3.04	1.50	1.50	-1.93	1.59
(t + Δt)	1.59													
2.0000		1.50	1.59	-2.04	1.75	1.08	-1.39	1.75	1.24	-1.60	2.00	0.79	-1.02	0.84
(t + Δt)	0.84													
2.5000		2.00	0.84	-1.08	2.25	0.57	-0.73	2.25	0.65	-0.84	2.50	0.42	-0.53	0.44
(t + Δt)	0.44													
3.0000		2.50	0.44	-0.57	2.50	0.30	-0.38	2.50	0.34	-0.44	3.00	0.44	-0.57	0.21
(t + Δt)	0.21													
3.5000		3.00	0.21	-0.27	3.00	0.21	-0.27	3.00	0.14	-0.18	3.50	0.21	-0.27	0.09
(t + Δt)	0.09													
4.0000		3.50	0.09	-0.11	3.50	0.09	-0.11	3.50	0.06	-0.08	4.00	0.09	-0.11	0.04
(t + Δt)	0.04													
4.5000		4.00	0.04	-0.05	4.00	0.04	-0.05	4.00	0.03	-0.03	4.50	0.04	-0.05	0.02
(t + Δt)	0.02													
5.0000		4.50	0.02	-0.02	4.50	0.02	-0.02	4.50	0.01	-0.01	5.00	0.02	-0.02	0.01

PO4 - 2



C1 9.23
C2 12.32

Danau	C (t) g/m^3	W_i g/hari	Q_i m^3/ha	V m^3	H m	A m^2	vs m/ha	k $hari^{-1}$	λ_i $hari^{-1}$
S.Baru 2	12.3	0	3381	20000	2	10000	0.01	0.073	0.247

initial condition

t = 0

c (t) = c_{danau} g/m^3

$c_1(t)$ = 12.3 g/m^3

$c_1(t + = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = f(t, = -\lambda_1 c_1$

dt 0.5 hr

t 0

$c_1(t)$ 12.32

$k_{11} = f(t, c(t)) = -$

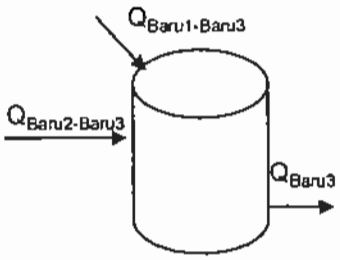
$k_{21} = f(t+ 1/2\Delta t, c(t)+ = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+ = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k = -\lambda_1 c_1 (t + \Delta t\, k_{31})$

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	12.320													12.320
0.5		0.000	12.320	-3.044	0.250	11.559	-2.856	0.250	11.606	-2.868	0.500	10.886	-2.690	10.888
(t + Δt)=0,5	10.888													
1.0		0.500	10.888	-2.690	0.750	9.543	-2.358	0.750	10.299	-2.545	1.000	9.616	-2.376	9.649
(t + Δt)= 1,0	9.649													
1.5		1.000	9.649	-2.384	1.250	9.053	-2.237	1.250	9.090	-2.246	1.500	8.526	-2.107	8.528
(t + Δt)= 1,5	8.528													
2.0		1.500	8.528	-2.107	1.750	8.001	-1.977	1.750	8.034	-1.985	2.000	7.535	-1.862	7.537
(t + Δt)= 2,0	7.537													
2.5		2.000	7.537	-1.862	2.250	7.071	-1.747	2.250	7.100	-1.754	2.500	6.660	-1.645	6.661
(t + Δt)= 2,5	6.661													
3.0		2.500	6.661	-1.646	2.500	6.249	-1.544	2.500	6.275	-1.550	3.000	6.661	-1.646	5.871
(t + Δt)= 3,0	5.871													
3.5		3.000	5.871	-1.451	3.000	5.871	-1.451	3.000	5.508	-1.361	3.500	5.871	-1.451	5.161
(t + Δt)= 3,5	5.161													
4.0		3.500	5.161	-1.275	3.500	5.161	-1.275	3.500	4.842	-1.196	4.000	5.161	-1.275	4.536
(t + Δt)= 4,0	4.536													
4.5		4.000	4.536	-1.121	4.000	4.536	-1.121	4.000	4.256	-1.052	4.500	4.536	-1.121	3.987
(t + Δt)= 4,5	3.987													
5.0		4.500	3.987	-0.985	4.500	3.987	-0.985	4.500	3.741	-0.924	5.000	3.987	-0.985	3.505
(t + Δt)= 5,0	3.505													
		5.000	3.505	-0.866	5.000	3.505	-0.866	5.000	3.288	-0.812	0.000	3.505	-0.866	3.081

PO4 - 3



Danau	C (t) g/m^3	W_i	Q_i m^3/ha	V m^3	H m	A m^2	v m/ha	k $hari^{-1}$	λ_i $hari^{-1}$
S. Baru 1	9.23	0	12092	10000	2	5000	0.01	0.073	1.287
S. Baru 2	12.32	0	3381.4	20000	2	10000	0.01	0.073	0.247
S. Baru 3	4.24	0	15474	12500	2.5	5000	0.01	0.073	1.315

$dc_4/dt = W_4/V + + -\lambda_4 c_4$

dt 0.5

initial condition

t = 0

c (t) = c_{danau} g/m^3

$c_4(t)$ = 4.24 g/m^3

$c_4(t + \Delta t = c_4(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

$k_{14} = f(t, c(t)) = W_3/V + + -\lambda_3 c_3$

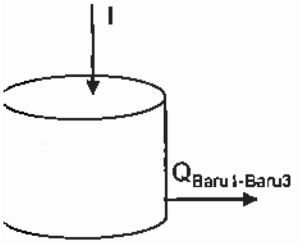
$k_{24} = f(t+ 1/2\Delta t, c(t = W(t + 1/ -\lambda 4c4 (t + 1/2 \Delta t\ k_{14})$
$+ (t + 1/2 + (t + 1/2 \Delta t\ k_{14})$

$k_{34} = f(t+ 1/2\Delta t, c(t = W(t + 1/ -\lambda 4c4 (t + 1/2 \Delta t\ k_{24})$
$+ (t + 1/2 + (t + 1/2 \Delta t\ k_{24})$

$k_{43} = f(t+ \Delta t, c(t)+ = W(t + \Delta t -\lambda 4c4 (t + \Delta t\ k_{34})$

Δt 0.5	$c_4(t)$	f		k_{14}	f		k_{24}	f		k_{34}	f		k_{44}	$c_4(t + \Delta t)$
t = 0	4.240													4.240
0.5		0.000	4.240	7.669	0.250	6.157	1.428	0.250	4.597	4.643	0.500	6.562	-1.242	5.787
(t + Δt)=0,5	5.787													
1.0		0.500	5.787	0.104	0.750	5.813	-3.937	0.750	4.803	0.625	1.000	6.100	-3.869	4.922
(t + Δt)= 1,0	4.922													
1.5		1.000	4.922	-1.191	1.250	4.624	-2.074	1.250	4.403	-1.400	1.500	4.222	-2.296	4.052
(t + Δt)= 1,5	4.052													
2.0		1.500	4.052	-1.966	1.750	3.561	-2.027	1.750	3.545	-1.802	2.000	3.151	-1.915	3.090
(t + Δt)= 2,0	3.090													
2.5		2.000	3.090	-1.779	2.250	2.646	-1.598	2.250	2.691	-1.548	2.500	2.317	-1.418	2.300
(t + Δt)= 2,5	2.300													
3.0		2.500	2.300	-1.366	2.750	1.958	-1.158	2.750	2.010	-1.167	3.000	1.716	-0.599	1.749
(t + Δt)= 3,0	1.749													
3.5		3.000	1.749	-1.056	3.250	1.485	-0.709	3.250	1.571	-0.965	3.500	1.266	-0.421	1.347
(t + Δt)= 3,5	1.347													
4.0		3.500	1.347	-0.791	3.750	1.149	-0.531	3.750	1.214	-0.705	4.000	0.994	-0.328	1.047
(t + Δt)= 4,0	1.047													
4.5		4.000	1.047	-0.565	4.250	0.906	-0.379	4.250	0.953	-0.502	4.500	0.796	-0.235	0.834
(t + Δt)= 4,5	0.834													
5.0		4.500	0.834	-0.403	4.750	0.733	-0.270	4.750	0.766	-0.362	5.000	0.653	-0.165	0.681
(t + Δt)= 5,0	0.681													
5.5		5.000	0.681	-0.295	5.250	0.607	-0.198	5.250	0.632	-0.269	5.500	0.547	-0.118	0.569
(t + Δt)= 5,1	0.569													
6.0		5.500	0.569	-0.745	5.750	0.383	-0.495	5.750	0.445	-0.560	6.000	0.279	-0.359	0.298
(t + Δt)= 5,2	0.298													
6.5		6.000	0.298	-0.392	6.250	0.200	-0.254	6.250	0.234	-0.302	6.500	0.147	-0.185	0.157
(t + Δt)= 5,3	0.157													
7.0		6.500	0.157	-0.211	6.750	0.104	-0.129	6.750	0.125	-0.158	7.000	0.078	-0.094	0.084
(t + Δt)= 5,4	0.084													
7.5		7.000	0.084	-0.118	7.250	0.054	-0.063	7.250	0.068	-0.084	7.500	0.042	-0.047	0.045
(t + Δt)= 5,5	0.045													
8.0		7.500	0.045	-0.071	7.750	0.028	-0.028	7.750	0.038	-0.045	8.000	0.023	-0.022	0.026
(t + Δt)= 5,6	0.026													
8.5		8.000	0.026	-0.047	8.250	0.014	-0.010	8.250	0.023	-0.025	8.500	0.013	-0.009	0.015
(t + Δt)= 5,7	0.015													

monium



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	vs m/har	k hari⁻¹	λ_1 hari⁻¹
S. Baru1	1.46	0	12092	10000	2	5000	0.01	0.183	1.3972

nitial condition

t = 0

c (t) = c_{danau} g/m³

$c_1(t)$ = 1.46 g/m³

$c_1(t+\Delta t) = c_1(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1(t)$

$k_{21} = f(t+ 1/2\Delta t, c(t)+1/2\Delta) = -\lambda_1 c_1 \quad (t + 1/2\ \Delta t\ k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/2\Delta) = -\lambda_1 c_1 \quad (t + 1/2\ \Delta t\ k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31}) = -\lambda_1 c_1 \quad (t + \Delta t\ k_{31})$

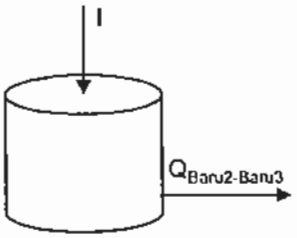
lt 0.5 hr

0

$c_1(t)$ 1.46

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	1.460													
0.5		0.000	1.460	-2.040	0.250	0.950	-1.327	0.250	1.128	-1.576	0.500	0.672	-0.939	0.728
(t + Δt)=0,5	0.728													
1.0		0.500	0.728	-1.017	0.750	0.219	-0.306	0.750	0.651	-0.910	1.000	0.273	-0.381	0.409
(t + Δt)= 1,0	0.409													
1.5		1.000	0.409	-0.571	1.250	0.266	-0.371	1.250	0.316	-0.441	1.500	0.188	-0.263	0.204
(t + Δt)= 1,5	0.204													
2.0		1.500	0.204	-0.285	1.750	0.133	-0.185	1.750	0.157	-0.220	2.000	0.094	-0.131	0.102
(t + Δt)= 2,0	0.102													
2.5		2.000	0.102	-0.142	2.250	0.066	-0.092	2.250	0.078	-0.110	2.500	0.047	-0.065	0.051
(t + Δt)= 2,5	0.051													
3.0		2.500	0.051	-0.071	2.500	0.033	-0.046	2.500	0.039	-0.055	3.000	0.051	-0.071	0.022
(t + Δt)= 3,0	0.022													
3.5		3.000	0.022	-0.031	3.000	0.022	-0.031	3.000	0.014	-0.020	3.500	0.022	-0.031	0.008
(t + Δt)= 3,5	0.008													
4.0		3.500	0.008	-0.012	3.500	0.008	-0.012	3.500	0.005	-0.008	4.000	0.008	-0.012	0.003
(t + Δt)= 4,0	0.003													
4.5		4.000	0.003	-0.005	4.000	0.003	-0.005	4.000	0.002	-0.003	4.500	0.003	-0.005	0.001
(t + Δt)= 4,5	0.001													
5.0		4.500	0.001	-0.002	4.500	0.001	-0.002	4.500	0.001	-0.001	5.000	0.001	-0.002	0.000
(t + Δt)= 5,0	0.000													
		5.000	0.000	-0.001	5.000	0.000	-0.001	5.000	0.000	0.000	0.000	0.000	-0.001	0.000

Amonium 2



C1 1.46
C2 0.8

Danau	C (t) g/m^3	W_i	Q_i m^3/h	V m^3	H m	A m^2	vs m/har	k $hari^{-1}$	λ_i $hari^{-1}$
S.Baru 2	0.8	0	3381	20000	2	10000	0.01	0.18	0.36

initial condition

$t = 0$

$c(t) = c_{danau}$ g/m^3

$c_1(t) = 0.8$ g/m^3

$c_1(t + = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -$

$k_{21} = f(t + 1/2\Delta t, c(t) + = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{21})$ 0.041667

$k_{41} = f(t + \Delta t, c(t) + \Delta t = -\lambda_1 c_1 (t + \Delta t\ k_{31})$

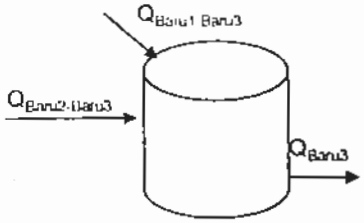
dt 0.5 hr

t 0

$c_1(t)$ 0.8

Δt 0.5	$c_1(t)$		f_{11}	k_{11}		f_{21}	k_{21}		f_{31}	k_{31}		f_{41}	k_{41}	$c_1(t + \Delta t)$
t = 0	0.8													0.800
0.5		0.000	0.8000	-0.286	0.250	0.729	-0.260	0.250	0.735	-0.262	0.500	0.669	-0.239	0.669
(t + Δt)=0,5	0.6692													
1.0		0.5	0.6692	-0.239	0.750	0.550	-0.196	0.750	0.620	-0.221	1.000	0.558	-0.199	0.563
(t + Δt)= 1,0	0.5630													
1.5		1.0	0.5630	-0.201	1.250	0.513	-0.183	1.250	0.517	-0.185	1.500	0.471	-0.168	0.471
(t + Δt)= 1,5	0.4710													
2.0		1.5	0.4710	-0.168	1.750	0.429	-0.153	1.750	0.433	-0.155	2.000	0.394	-0.141	0.394
(t + Δt)= 2,0	0.3940													
2.5		2	0.3940	-0.141	2.250	0.359	-0.128	2.250	0.362	-0.129	2.500	0.329	-0.118	0.330
(t + Δt)= 2,5	0.3296													
3.0		2.5	0.3296	-0.118	2.500	0.300	-0.107	2.500	0.303	-0.108	3.000	0.330	-0.118	0.274
(t + Δt)= 3,0	0.2741													
3.5		3.0	0.2741	-0.098	3.000	0.274	-0.098	3.000	0.250	-0.089	3.500	0.274	-0.098	0.227
(t + Δt)= 3,5	0.2266													
4.0		3.5	0.2266	-0.081	3.500	0.227	-0.081	3.500	0.206	-0.074	4.000	0.227	-0.081	0.187
(t + Δt)= 4,0	0.1873													
4.5		4.0	0.1873	-0.067	4.000	0.187	-0.067	4.000	0.171	-0.061	4.500	0.187	-0.067	0.155
(t + Δt)= 4,5	0.1549													
5.0		4.5	0.1549	-0.055	4.500	0.155	-0.055	4.500	0.141	-0.050	5.000	0.155	-0.055	0.128
(t + Δt)= 5,0	0.1281													
		5.0	0.1281	-0.046	5.000	0.128	-0.046	5.000	0.117	-0.042	0.000	0.128	-0.046	0.106

monium 3



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_i hari⁻¹
S. Baru 1	1.46	0	12092.29	10000	2	5000	0.01	0.183	1.397
S. Baru 2	0.8	0	3381.41	20000	2	10000	0.01	0.183	0.357
S. Baru 3	0.27	0	15473.70	12500	2.5	5000	0.01	0.183	1.425

c_4/dt W_3/V + Q_{14}/V_1 c_{14} + $Q_{34}/V_3 c_{34}$ $-\lambda_4 c_4$

$c_4(t+\Delta t) = c_4(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

$= W_3/V + Q_{14}/V_1 c_{14} + Q_{34}/V_3 c_{34} - \lambda_3 c_3$

$k_{14} = f(t, c(t))$

ll 0.5

$k_{24} = f(t+ 1/2\Delta t, c(t)+$ = W(t + 1, -λ4c4 (t + 1/2 Δt k_{14}) + $Q_{14}/V_1 c_{14}$ + $Q_{34}/V_3 c_{34}$ (t + 1/2 Δt k_{14})

nitial condition

t = 0

c (t) = c_{danau} g/m³

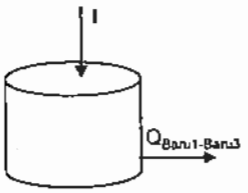
$_4(t)$ = 0.27 g/m³

$k_{34} = f(t+ 1/2\Delta t, c(t)+$ = W(t + 1, -λ4c4 (t + 1/2 Δt k_{24}) + (t + 1/2 + (t + 1/2 Δt k_{24})

$k_{43} = f(t+ \Delta t, c(t)+\Delta t$ = W(t + Δt -λ4c4 (t + Δt k_{34})

Δt 0.5	$c_4(t)$	f		k_{14}	f		k_{24}	f		k_{34}	f		k_{44}	$c_4(t+\Delta t)$
= 0	0.270													0.270
0.5		0.000	0.270	1.516	0.250	0.649	0.347	0.250	0.357	0.980	0.500	0.760	-0.157	0.604
(t + Δt)=0,5	0.604421712													
1.0		0.5	0.604	0.132	0.750	0.637	-0.550	0.750	0.467	0.227	1.000	0.718	-0.599	0.512
(t + Δt)= 1,0	0.511699738													
1.5		1.0	0.512	-0.140	1.250	0.477	-0.271	1.250	0.444	-0.163	1.500	0.430	-0.306	0.402
(t + Δt)= 1,5	0.402154433													
2.0		1.5	0.402	-0.247	1.750	0.340	-0.252	1.750	0.339	-0.220	2.000	0.292	-0.237	0.283
(t + Δt)= 2,0	0.283192822													
2.5		2	0.283	-0.214	2.250	0.230	-0.187	2.250	0.237	-0.181	2.500	0.193	-0.162	0.191
(t + Δt)= 2,5	0.190542062													
3.0		2.5	0.191	-0.155	2.750	0.152	-0.126	2.750	0.159	-0.128	3.000	0.126	-0.063	0.130
(t + Δt)= 3,0	0.130048882													
3.5		3	0.130	-0.112	3.250	0.102	-0.072	3.250	0.112	-0.100	3.500	0.080	-0.041	0.089
(t + Δt)= 3,5	0.088552528													
4.0		3.5	0.089	-0.078	3.750	0.069	-0.050	3.750	0.076	-0.067	4.000	0.055	-0.030	0.060
(t + Δt)= 4,0	0.060104767													
4.5		4	0.060	-0.050	4.250	0.048	-0.032	4.250	0.052	-0.043	4.500	0.039	-0.020	0.042
(t + Δt)= 4,5	0.041799942													
5.0		4.5	0.042	-0.032	4.750	0.034	-0.021	4.750	0.037	-0.027	5.000	0.028	-0.012	0.030
(t + Δt)= 5,0	0.030123642													
5.5		5	0.030	-0.021	5.250	0.025	-0.013	5.250	0.027	-0.018	5.500	0.021	-0.008	0.023
(t + Δt)= 5,1	0.022512199													
6.0		5.5	0.023	-0.032	5.750	0.014	-0.021	5.750	0.017	-0.025	6.000	0.010	-0.014	0.011
(t + Δt)= 5,2	0.01107166													
6.5		6	0.011	-0.016	6.250	0.007	-0.010	6.250	0.009	-0.012	6.500	0.005	-0.007	0.005
(t + Δt)= 5,3	0.005445121													
7.0		6.5	0.005	-0.008	6.750	0.004	-0.005	6.750	0.004	-0.006	7.000	0.002	-0.003	0.003
(t + Δt)= 5,4	0.002677949													
7.5		7	0.003	-0.004	7.250	0.002	-0.002	7.250	0.002	-0.003	7.500	0.001	-0.002	0.001
(t + Δt)= 5,5	0.001317035													
8.0		7.5	0.001	-0.002	7.750	0.001	-0.001	7.750	0.001	-0.001	8.000	0.001	-0.001	0.001
(t + Δt)= 5,6	0.000647727													
8.5		8	0.001	-0.001	8.250	0.000	-0.001	8.250	0.000	-0.001	8.500	0.000	0.000	0.000
(t + Δt)= 5,7	0.000318557													

TSS 1



C1 1677
C2 1455

Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	vs m/har	k hari⁻¹	λ_i hari⁻¹
S. Baru1	1677	0	12092.29	10000	2	5000	0.01	0.123	1.337229

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_1(t)$ = 1677 g/m³

$c_1(t+\Delta t) = c_1(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1(t)$

$k_{21} = f(t+ 1/2\Delta t, c(t)+1/2\Delta t k_{11}) = -\lambda_1 c_1 \quad (t + 1/2\,\Delta t\, k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/2\Delta t k_{21}) = -\lambda_1 c_1 \quad (t + 1/2\,\Delta t\, k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31}) = -\lambda_1 c_1 \quad (t + \Delta t\, k_{31})$

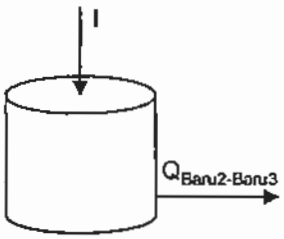
dt 0.5 hr

t 0

$c_1(t)$ 1677

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t$
t = 0	1677													167
0.5		0.000	1677.000	-2242.533	0.250	1116.367	-1492.638	0.250	1303.791	-1743.466	0.500	805.267	-1076.826	881.00
(t + Δt)=0,5	881.0026707													
1.0		0.5	881.0026707	-1151.358	0.750	285.324	-381.543	0.750	765.617	-1023.805	1.000	349.100	-466.827	491.92
(t + Δt)= 1,0	491.9292378													
1.5		1.0	491.9292378	-657.822	1.250	327.474	-437.907	1.250	382.452	-511.426	1.500	236.216	-315.875	252.56
(t + Δt)= 1,5	252.5655263													
2.0		1.5	252.5655263	-337.738	1.750	168.131	-224.830	1.750	196.358	-262.576	2.000	121.278	-162.176	129.67
(t + Δt)= 2,0	129.6717905													
2.5		2	129.6717905	-173.401	2.250	86.322	-115.432	2.250	100.814	-134.811	2.500	62.266	-83.264	66.57
(t + Δt)= 2,5	66.57588428													
3.0		2.5	66.57588428	-89.027	2.500	44.319	-59.265	2.500	51.760	-69.215	3.000	66.576	-89.027	30.32
(t + Δt)= 3,0	30.32479623													
3.5		3.0	30.32479623	-40.551	3.000	30.325	-40.551	3.000	20.187	-26.995	3.500	30.325	-40.551	12.30
(t + Δt)= 3,5	12.30862442													
4.0		3.5	12.30862442	-16.459	3.500	12.309	-16.459	3.500	8.194	-10.957	4.000	12.309	-16.459	4.99
(t + Δt)= 4,0	4.995985266													
4.5		4.0	4.995985266	-6.681	4.000	4.996	-6.681	4.000	3.326	-4.447	4.500	4.996	-6.681	2.02
(t + Δt)= 4,5	2.027835762													
5.0		4.5	2.027835762	-2.712	4.500	2.028	-2.712	4.500	1.350	-1.805	5.000	2.028	-2.712	0.82
(t + Δt)= 5.0	0.823084468													
		5.0	0.823084468	-1.101	5.000	0.823	-1.101	5.000	0.548	-0.733	0.000	0.823	-1.101	0.33

TSS - 2



C1 1677
C2 1455

Danau	C (t) g/m^3	W_i g/hari	Q_i m^3/har	V m^3	H m	A m^2	vs m/h	k $hari^{-1}$	λ_1 $hari^{-1}$
S.Baru 2	1455	0	3381.4	20000	2	10000	0	0.123	0.2971

initial condition

t = 0

$c(t) = c_{danau}$ g/m^3

$c_1(t) = 1455.4$ g/m^3

$c_1(t + \Delta t) = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = f(t, = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1(t)$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2. = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2. = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{21})$

$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31}) = -\lambda_1 c_1 (t + \Delta t\, k_{31})$

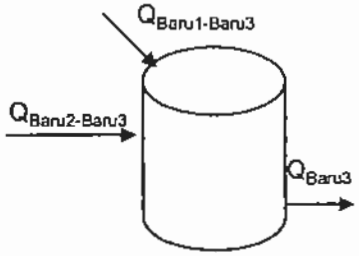
dt = 0.5 hr

t = 0

$c_1(t)$ = 1455.4

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	1455.40													1455.40
0.5		0.00	1455.40	-432.36	0.25	1347.31	-400.25	0.25	1355.34	-402.63	0.50	1254.08	-372.55	1254.51
(t + Δt)=0,5	1254.51													
1.0		0.50	1254.51	-372.68	0.75	1068.17	-317.32	0.75	1175.18	-349.11	1.00	1079.96	-320.82	1085.65
(t + Δt)= 1,0	1085.65													
1.5		1.00	1085.65	-322.51	1.25	1005.02	-298.56	1.25	1011.01	-300.34	1.50	935.48	-277.90	935.80
(t + Δt)= 1,5	935.80													
2.0		1.50	935.80	-278.00	1.75	866.30	-257.35	1.75	871.46	-258.88	2.00	806.35	-239.54	806.63
(t + Δt)= 2,0	806.63													
2.5		2.00	806.63	-239.63	2.25	746.72	-221.83	2.25	751.17	-223.15	2.50	695.05	-206.48	695.29
(t + Δt)= 2.5	695.29													
3.0		2.50	695.29	-206.55	2.50	643.65	-191.21	2.50	647.49	-192.35	3.00	695.29	-206.55	596.94
(t + Δt)= 3,0	596.94													
3.5		3.00	596.94	-177.33	3.00	596.94	-177.33	3.00	552.60	-164.16	3.50	596.94	-177.33	510.47
(t + Δt)= 3,5	510.47													
4.0		3.50	510.47	-151.64	3.50	510.47	-151.64	3.50	472.56	-140.38	4.00	510.47	-151.64	436.52
(t + Δt)= 4,0	436.52													
4.5		4.00	436.52	-129.68	4.00	436.52	-129.68	4.00	404.10	-120.05	4.50	436.52	-129.68	373.29
(t + Δt)= 4,5	373.29													
5.0		4.50	373.29	-110.89	4.50	373.29	-110.89	4.50	345.56	-102.66	5.00	373.29	-110.89	319.21
(t + Δt)= 5,0	319.21													
		5.00	319.21	-94.83	5.00	319.21	-94.83	5.00	295.51	-87.79	0.00	319.21	-94.83	272.97

TSS-3



Danau	C (t) g/m^3	W_i g/hari	Q_i m^3/hari	V m^3	H m	A m^2	v m/h	k $hari^{-1}$	λ_i $hari^{-1}$
S.Baru 1	1677	0	12092.29	10000	2	5000	0.01	0.123	1.337
S. Baru2	1455	0	3381.408	20000	2	10000	0.01	0.123	0.297
S. Baru3	1248	0	15473.7	12500	2.5	5000	0.01	0.123	1.365

dc_4/dt = W_i/V + + $-\lambda_4 c_4$

dt 0.5

initial condition

t = 0

c (t) = c_{danau} g/m^3

$c_4(t)$ = 1248 g/m^3

$c_4(t + \Delta t)$ = $c_4(t)$ + $1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

$k_{14} = f(t, c(t))$ = W_3/V + + $-\lambda_3 c_3$

$k_{24} = f(t+ 1/2\Delta t, c(t)$ = $W(t + 1/2$ $-\lambda 4 c4$ $(t + 1/2 \Delta t\ k_{14})$

+ $(t + 1/$ + $(t + 1/2 \Delta t\ k_{14})$

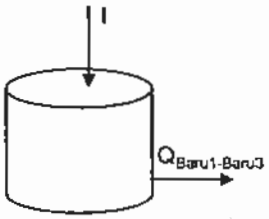
$k_{34} = f(t+ 1/2\Delta t, c(t)$ = $W(t + 1/2$ $-\lambda 4 c4$ $(t + 1/2 \Delta t\ k_{24})$

+ $(t + 1/$ + $(t + 1/2 \Delta t\ k_{24})$

$k_{43} = f(t+ \Delta t, c(t)+\Delta t$ = $W(t + \Delta t)$ $-\lambda 4 c4$ $(t + \Delta t\ k_{34})$

Δt 0.5	$c_4(t)$	f		k_{14}	f		k_{24}	f		k_{34}	f		k_{44}	$c_4(t + \Delta t)$
t = 0	1248.00													1248.00
0.5		0.00	1248.00	570.55	0.25	1390.64	-320.34	0.25	1167.91	211.65	0.50	1353.82	-662.05	1222.26
(t + Δt)=0,5	1222.26													
1.0		0.50	1222.26	-415.01	0.75	1118.51	-1001.03	0.75	972.00	-202.19	1.00	1121.17	-925.54	910.01
(t + Δt)= 1,0	910.01													
1.5		1.00	910.01	-463.66	1.25	794.09	-517.95	1.25	780.52	-431.93	1.50	694.05	-503.50	671.10
(t + Δt)= 1,5	671.10													
2.0		1.50	671.10	-452.36	1.75	558.01	-411.85	1.75	568.14	-390.67	2.00	475.77	-366.39	469.12
(t + Δt)= 2,0	469.12													
2.5		2.00	469.12	-347.12	2.25	382.34	-291.22	2.25	396.31	-292.02	2.50	323.11	-248.20	322.30
(t + Δt)= 2,5	322.30													
3.0		2.50	322.30	-241.85	2.75	261.84	-194.97	2.75	273.56	-201.32	3.00	221.64	-104.46	227.39
(t + Δt)= 3,0	227.39													
3.5		3.00	227.39	-172.78	3.25	184.20	-113.82	3.25	198.94	-153.69	3.50	150.55	-67.89	162.75
(t + Δt)= 3,5	162.75													
4.0		3.50	162.75	-120.95	3.75	132.52	-79.68	3.75	142.83	-105.15	4.00	110.18	-49.19	117.77
(t + Δt)= 4,0	117.77													
4.5		4.00	117.77	-80.90	4.25	97.54	-53.29	4.25	104.45	-70.21	4.50	82.66	-32.98	87.69
(t + Δt)= 4,5	87.69													
5.0		4.50	87.69	-54.13	4.75	74.16	-35.66	4.75	78.78	-47.47	5.00	63.96	-21.73	67.52
(t + Δt)= 5,0	67.52													
5.5		5.00	67.52	-37.19	5.25	58.22	-24.50	5.25	61.39	-33.17	5.50	50.93	-14.55	53.59
(t + Δt)= 5,1	53.59													
6.0		5.50	53.59	-73.15	5.75	35.31	-48.19	5.75	41.55	-56.71	6.00	25.24	-34.45	27.14
(t + Δt)= 5,2	27.14													
6.5		6.00	27.14	-37.05	6.25	17.88	-24.41	6.25	21.04	-28.72	6.50	12.78	-17.45	13.75
(t + Δt)= 5,3	13.75													
7.0		6.50	13.75	-18.77	6.75	9.06	-12.36	6.75	10.66	-14.55	7.00	6.47	-8.84	6.96
(t + Δt)= 5,4	6.96													
7.5		7.00	6.96	-9.50	7.25	4.59	-6.26	7.25	5.40	-7.37	7.50	3.28	-4.48	3.53
(t + Δt)= 5,5	3.53													
8.0		7.50	3.53	-4.81	7.75	2.32	-3.17	7.75	2.73	-3.73	8.00	1.66	-2.27	1.79
(t + Δt)= 5,6	1.79													
8.5		8.00	1.79	-2.44	8.25	1.18	-1.61	8.25	1.38	-1.89	8.50	0.84	-1.15	0.90

Amonium



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	vs m/har	k $hari^{-1}$	λ_i $hari^{-1}$
S. Baru1	1.46	0	12092	10000	2	5000	0.01	0	1.2142

initial condition

t = 0

$c(t) = c_{danau}$ g/m³

$c_1(t) = 1.46$ g/m³

$c_1(t+\ell = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1(t)$

$k_{21} = f(t+ 1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31}) = -\lambda_1 c_1 (t + \Delta t\ k_{31})$

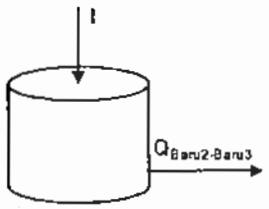
dt 0.5 hr

t 0

$c_1(t)$ 1.46

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	1.460													
0.5		0.000	1.460	-1.773	0.250	1.017	-1.235	0.250	1.151	-1.398	0.500	0.761	-0.924	0.796
(t + Δt)=0.5	0.796													
1.0		0.500	0.796	-0.967	0.750	0.313	-0.380	0.750	0.702	-0.852	1.000	0.371	-0.450	0.473
(t + Δt)= 1,0	0.473													
1.5		1.000	0.473	-0.574	1.250	0.329	-0.400	1.250	0.373	-0.453	1.500	0.247	-0.299	0.258
(t + Δt)= 1,5	0.258													
2.0		1.500	0.258	-0.313	1.750	0.180	-0.218	1.750	0.204	-0.247	2.000	0.135	-0.163	0.141
(t + Δt)= 2,0	0.141													
2.5		2.000	0.141	-0.171	2.250	0.098	-0.119	2.250	0.111	-0.135	2.500	0.073	-0.089	0.077
(t + Δt)= 2,5	0.077													
3.0		2.500	0.077	-0.093	2.500	0.053	-0.065	2.500	0.061	-0.074	3.000	0.077	-0.093	0.038
(t + Δt)= 3,0	0.038													
3.5		3.000	0.038	-0.046	3.000	0.038	-0.046	3.000	0.027	-0.032	3.500	0.038	-0.046	0.017
(t + Δt)= 3,5	0.017													
4.0		3.500	0.017	-0.021	3.500	0.017	-0.021	3.500	0.012	-0.015	4.000	0.017	-0.021	0.008
(t + Δt)= 4,0	0.008													
4.5		4.000	0.008	-0.010	4.000	0.008	-0.010	4.000	0.005	-0.007	4.500	0.008	-0.010	0.004
(t + Δt)= 4,5	0.004													
5.0		4.500	0.004	-0.004	4.500	0.004	-0.004	4.500	0.002	-0.003	5.000	0.004	-0.004	0.002
(t + Δt)= 5,0	0.002													
		5.000	0.002	-0.002	5.000	0.002	-0.002	5.000	0.001	-0.001	0.000	0.002	-0.002	0.001

Amonium 2



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_I g/hari	Q_I m³/hari	V m³	H m	A m²	vs m/hari	k $hari^{-1}$	λ_I $hari^{-1}$
S.Baru 2	0.8	0	3381.41	15000	2	7500	0.01	0	0.23043

initial condition

t = 0

$c(t) = c_{danau}$ g/m³

$c_I(t) = 0.8$ g/m³

$c_I(t+\Delta t) = c_I(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_I/dt = f(t, c_I(t)) = -\lambda_1 c_I$

$k_{11} = f(t, c(t)) = -$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11}) = -\lambda_1 c_I \quad (t + 1/2\,\Delta t\, k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21}) = -\lambda_1 c_I \quad (t + 1/2\,\Delta t\, k_{21})$

$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31}) = -\lambda_1 c_I \quad (t + \Delta t\, k_{31})$

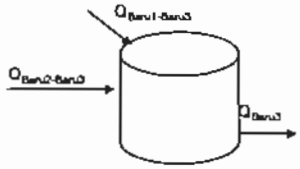
dt = 0.5 hr

t = 0

$c_I(t) = 0.8$

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	0.80													
0.5		0.00	0.80	-0.18	0.25	0.75	-0.17	0.25	0.76	-0.17	0.50	0.71	-0.16	0.71
(t + Δt)=0,5	0.71													
1.0		0.50	0.71	-0.16	0.75	0.63	-0.15	0.75	0.68	-0.16	1.00	0.63	-0.15	0.64
(t + Δt)= 1.0	0.64													
1.5		1.00	0.64	-0.15	1.25	0.60	-0.14	1.25	0.60	-0.14	1.50	0.57	-0.13	0.57
(t + Δt)= 1,5	0.57													
2.0		1.50	0.57	-0.13	1.75	0.53	-0.12	1.75	0.54	-0.12	2.00	0.51	-0.12	0.51
(t + Δt)= 2,0	0.51													
2.5		2.00	0.51	-0.12	2.25	0.48	-0.11	2.25	0.48	-0.11	2.50	0.45	-0.10	0.45
(t + Δt)= 2,5	0.45													
3.0		2.50	0.45	-0.10	2.50	0.42	-0.10	2.50	0.43	-0.10	3.00	0.45	-0.10	0.40
(t + Δt)= 3,0	0.40													
3.5		3.00	0.40	-0.09	3.00	0.40	-0.09	3.00	0.38	-0.09	3.50	0.40	-0.09	0.36
(t + Δt)= 3,5	0.36													
4.0		3.50	0.36	-0.08	3.50	0.36	-0.08	3.50	0.33	-0.08	4.00	0.36	-0.08	0.32
(t + Δt)= 4,0	0.32													
4.5		4.00	0.32	-0.07	4.00	0.32	-0.07	4.00	0.30	-0.07	4.50	0.32	-0.07	0.28
(t + Δt)= 4,5	0.28													
5.0		4.50	0.28	-0.06	4.50	0.28	-0.06	4.50	0.26	-0.06	5.00	0.28	-0.06	0.25
(t + Δt)= 5.0	0.25													
		5.00	0.25	-0.06	5.00	0.25	-0.06	5.00	0.23	-0.05	0.00	0.25	-0.06	0.22

Amonium 3



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_i hari⁻¹
S Baru 1	1.46	0	12092.2899	10000	2	5000	0.01	0	1.214
S Baru 2	0.8	0	3381.408	15000	2	7500	0.01	0	0.230
S Baru 3	0.27	0	15473.6979	18750	2.5	7500	0.01	0	0.829

$\frac{dc_4}{dt} = W_i/V + Q_1/V_1 c_{11} + Q_2/V_2 c_{24} - \lambda_4 c_4$

dt 0.5

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_4(t)$ = 0.27 g/m³

$c_4(t + \Delta t) = c_4(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

$k_{14} = f(t, c(t)) = W_i/V + Q_1/V_1 c_{14} + Q_2/V_2 c_{24} - \lambda_4 c_4$

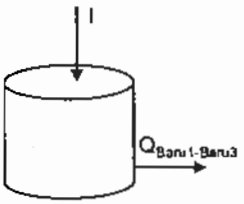
$k_{24} = f(t + 1/2\Delta t, c(t) + 1/2\Delta k_{14}) = W_i/(t + 1/2\ \Delta t) - \lambda_4 c_4 + Q_1/V_1 c_{11} + Q_2/V_2 c_{24} (1 + 1/2\ \Delta t\ k_{14}) (1 + 1/2\ \Delta t\ k_{14})$

$k_{34} = f(t + 1/2\Delta t, c(t) + 1/2\Delta k_{24}) = W_i/(t + 1/2\ \Delta t) - \lambda_4 c_4 + Q_1/V_1 c_{11} + Q_2/V_2 c_{24} (1 + 1/2\ \Delta t\ k_{24}) (1 + 1/2\ \Delta t\ k_{24})$

$k_{44} = f(t + \Delta t, c(t) + \Delta k_{34}) = W_i/(t + \Delta t) - \lambda_4 c_4 (t + \Delta t\ k_{34})$

Δt 0.5	$c_4(t)$	f		k_{14}	f		k_{34}	f		k_{34}	f		k_{44}	$c_4(t + \Delta t)$
t = 0	0.270													
0.5		0.000	0.270	1.722	0.250	0.700	0.819	0.250	0.475	1.169	0.500	0.855	0.372	0.775812228
(t + Δt)=0,5	0.775812223													
1.0		0.5	0.776	0.481	0.750	0.898	-0.222	0.750	0.720	0.404	1.000	0.978	-0.219	0.827789223
(t + Δt)= 1,0	0.827789222													
1.5		1.0	0.828	0.029	1.250	0.835	-0.159	1.250	0.768	-0.067	1.500	0.794	-0.233	0.773249426
(t + Δt)= 1,5	0.773249443													
2.0		1.5	0.773	-0.201	1.750	0.721	-0.262	1.750	0.708	-0.220	2.000	0.663	-0.273	0.653457919
(t + Δt)= 2,0	0.653457782													
2.5		2	0.653	-0.258	2.250	0.589	-0.262	2.250	0.588	-0.245	2.500	0.531	-0.250	0.526534736
(t + Δt)= 2,5	0.52653474													
3.0		2.5	0.527	-0.242	2.750	0.466	-0.226	2.750	0.470	-0.220	3.000	0.418	-0.151	0.419389755
(t + Δt)= 3,0	0.41938975													
3.5		3	0.419	-0.211	3.250	0.367	-0.187	3.250	0.376	-0.196	3.500	0.322	-0.130	0.330401892
(t + Δt)= 3,5	0.33040169													
4.0		3.5	0.330	-0.173	3.750	0.287	-0.137	3.750	0.298	-0.155	4.000	0.253	-0.108	0.258210147
(t + Δt)= 4,0	0.25821015													
4.5		4	0.258	-0.134	4.250	0.225	-0.106	4.250	0.232	-0.119	4.500	0.199	-0.084	0.202653579
(t + Δt)= 4,5	0.20265358													
5.0		4.5	0.203	-0.101	4.750	0.177	-0.080	4.750	0.183	-0.089	5.000	0.158	-0.064	0.160803772
(t + Δt)= 5,0	0.16080377													
5.5		5	0.161	-0.075	5.250	0.142	-0.060	5.250	0.146	-0.067	5.500	0.127	-0.048	0.129421618
(t + Δt)= 5,1	0.12942162													
6.0		5.5	0.129	-0.107	5.750	0.103	-0.085	5.750	0.106	-0.090	6.000	0.085	-0.070	0.08550612
(t + Δt)= 5,2	0.08550612													
6.5		6	0.086	-0.071	6.250	0.068	-0.056	6.250	0.071	-0.059	6.500	0.056	-0.048	0.056492086
(t + Δt)= 5,3	0.05649209													
7.0		6.5	0.056	-0.047	6.750	0.045	-0.037	6.750	0.047	-0.039	7.000	0.037	-0.031	0.037323125
(t + Δt)= 5,4	0.03732313													
7.5		7	0.037	-0.031	7.250	0.030	-0.025	7.250	0.031	-0.026	7.500	0.024	-0.020	0.024658599
(t + Δt)= 5,5	0.0246586													
8.0		7.5	0.025	-0.020	7.750	0.020	-0.016	7.750	0.021	-0.017	8.000	0.016	-0.013	0.016291414
(t + Δt)= 5,6	0.01629141													
8.5		8	0.016	-0.014	8.250	0.013	-0.011	8.250	0.014	-0.011	8.500	0.011	-0.009	0.010763393
(t + Δt)= 5,7	0.01076339													

TSS



C1 1677
C2 1455

Danau	C (t) g/m^3	W_i g/hari	Q_i m^3/hari	V m^3	H m	A m^2	vs m/hari	k $hari^{-1}$	λ_i $hari^{-1}$
S. Barul	1677	0	12092.3	10000	2	5000	0.01	0	1.214229

initial condition

t = 0

c (t) = c_{danau} g/m^3

$c_1(t)$ = 1677 g/m^3

$c_1(t + \Delta t) = c_1(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_1) = -\lambda_1 c_1\ (t + 1/2\ \Delta t\ k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_2) = -\lambda_1 c_1\ (t + 1/2\ \Delta t\ k_{21})$

$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31}) = -\lambda_1 c_1\ (t + \Delta t\ k_{31})$

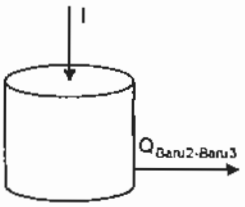
dt = 0.5 hr

t = 0

$c_1(t)$ = 1677

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	1677.0													
0.5		0.0	1677.0	-2036.3	0.3	1167.9	-1418.1	0.3	1322.5	-1605.8	0.5	874.1	-1061.4	914.9
(t + Δt)=0,5	914.9													
1.0		0.5	914.9	-1110.9	0.8	359.4	-436.4	0.8	805.8	-978.4	1.0	425.7	-516.9	543.4
(t + Δt)= 1,0	543.4													
1.5		1.0	543.4	-659.8	1.3	378.5	-459.5	1.3	428.5	-520.3	1.5	283.3	-343.9	296.5
(t + Δt)= 1,5	296.5													
2.0		1.5	296.5	-360.0	1.8	206.5	-250.7	1.8	233.8	-283.9	2.0	154.5	-187.6	161.7
(t + Δt)= 2,0	161.7													
2.5		2.0	161.7	-196.4	2.3	112.6	-136.8	2.3	127.5	-154.9	2.5	84.3	-102.4	88.2
(t + Δt)= 2,5	88.2													
3.0		2.5	88.2	-107.1	2.5	61.4	-74.6	2.5	69.6	-84.5	3.0	88.2	-107.1	43.9
(t + Δt)= 3,0	43.9													
3.5		3.0	43.9	-53.3	3.0	43.9	-53.3	3.0	30.5	-37.1	3.5	43.9	-53.3	19.9
(t + Δt)= 3,5	19.9													
4.0		3.5	19.9	-24.2	3.5	19.9	-24.2	3.5	13.9	-16.9	4.0	19.9	-24.2	9.1
(t + Δt)= 4,0	9.1													
4.5		4.0	9.1	-11.0	4.0	9.1	-11.0	4.0	6.3	-7.7	4.5	9.1	-11.0	4.1
(t + Δt)= 4,5	4.1													
5.0		4.5	4.1	-5.0	4.5	4.1	-5.0	4.5	2.9	-3.5	5.0	4.1	-5.0	1.9
(t + Δt)= 5,0	1.9													
		5.0	1.9	-2.3	5.0	1.9	-2.3	5.0	1.3	-1.6	0.0	1.9	-2.3	0.8

PO4-2



C1 9.23
C2 12.32

Danau	C (I) g/m³	W_I g/hari	Q_I m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ_I hari⁻¹
S.Baru 2	12.32	0	3381.4	15000	2	7500	0.01	0	0.2304

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_I(t)$ = 12.32 g/m³ $\quad c_I(t+\Delta t) = c_I(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_I/dt = f(t, \quad) = -\lambda_I c_I$

$k_{11} = f(t, c(t)) = -$

$k_{21} = f(t+ 1/2\Delta t, c(t)+ 1/2\Delta t k_{11}) = -\lambda_I c_I \;(t + 1/2\,\Delta t\, k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/2\Delta t k_{21}) = -\lambda_I c_I \;(t + 1/2\,\Delta t\, k_{21})$

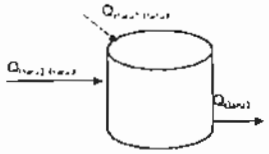
$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31}) = -\lambda_I c_I \;(t + \Delta t\, k_{31})$

dt = 0.5 hr

t = 0

$c_I(t)$ = 12.32

Δt 0.5	$c_I(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_I(t+\Delta t)$
t = 0	12.32													
0.5		0.00	12.32	-2.84	0.25	11.61	-2.68	0.25	11.65	-2.68	0.50	10.98	-2.53	10.98
(t + Δt)=0,5	10.98													
1.0		0.50	10.98	-2.53	0.75	9.71	-2.24	0.75	10.42	-2.40	1.00	9.78	-2.25	9.81
(t + Δt)= 1,0	9.81													
1.5		1.00	9.81	-2.26	1.25	9.24	-2.13	1.25	9.28	-2.14	1.50	8.74	-2.01	8.74
(t + Δt)= 1,5	8.74													
2.0		1.50	8.74	-2.01	1.75	8.24	-1.90	1.75	8.27	-1.90	2.00	7.79	-1.79	7.79
(t + Δt)= 2,0	7.79													
2.5		2.00	7.79	-1.79	2.25	7.34	-1.69	2.25	7.37	-1.70	2.50	6.94	-1.60	6.94
(t + Δt)= 2,5	6.94													
3.0		2.50	6.94	-1.60	2.50	6.54	-1.51	2.50	6.56	-1.51	3.00	6.94	-1.60	6.17
(t + Δt)= 3,0	6.17													
3.5		3.00	6.17	-1.42	3.00	6.17	-1.42	3.00	5.82	-1.34	3.50	6.17	-1.42	5.47
(t + Δt)= 3,5	5.47													
4.0		3.50	5.47	-1.26	3.50	5.47	-1.26	3.50	5.16	-1.19	4.00	5.47	-1.26	4.86
(t + Δt)= 4,0	4.86													
4.5		4.00	4.86	-1.12	4.00	4.86	-1.12	4.00	4.58	-1.05	4.50	4.86	-1.12	4.31
(t + Δt)= 4,5	4.31													
5.0		4.50	4.31	-0.99	4.50	4.31	-0.99	4.50	4.06	-0.94	5.00	4.31	-0.99	3.82
(t + Δt)= 5,0	3.82													
		5.00	3.82	-0.88	5.00	3.82	-0.88	5.00	3.60	-0.83	0.00	3.82	-0.88	3.39



Danau	C (t) g/m³	W_t g/hari	Q_t m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_t hari⁻¹
S. Baru 1	9.23	0	12092.7899	10000	2	5000	0.01	0	1.214
S. Baru 2	12.32	0	3381.409	15000	2	7500	0.01	0	0.230
S. Baru 3	4.24	0	15473.6979	18750	2.5	7500	0.01	0	0.829

Δt = 0.5

Initial condition

t = 0

$c(t)$ = c_{awal} g/m³

$c_0(t)$ = 4.24 g/m³

$c_0(t+\Delta t) = c_0(t) + \frac{1}{6}(k_1 + 2k_2 + 2k_3 + k_4)\Delta t$

$k_1 = f(t, c(t)) = -\frac{W_t}{V} + \frac{Q_{in}V_{in}}{V} + \frac{Q_{out}V_{out}}{V} - \lambda_{eff}$

$k_2 = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_1) = -\frac{W(t+1/2\Delta t)}{V(t+1/2\Delta t)} + \frac{Q_{in}V_{in}}{V(t+1/2\Delta t)}(t+1/2\Delta t)_{in} + \frac{Q_{out}V_{out}}{V(t+1/2\Delta t)}(t+1/2\Delta t)_{out} - \lambda_{eff}(t+1/2\Delta t)$

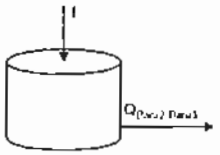
$k_3 = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_2) = -\frac{W(t+1/2\Delta t)}{V(t+1/2\Delta t)} + \frac{Q_{in}V_{in}}{V(t+1/2\Delta t)}(t+1/2\Delta t)_{in} + \frac{Q_{out}V_{out}}{V(t+1/2\Delta t)}(t+1/2\Delta t)_{out} - \lambda_{eff}(t+1/2\Delta t)$

$k_4 = f(t + \Delta t, c(t) + \Delta t k_3) = -\frac{W(t+\Delta t)}{V(t+\Delta t)} + \frac{Q_{in}V_{in}}{V(t+\Delta t)}(t+\Delta t)_{in} + \frac{Q_{out}V_{out}}{V(t+\Delta t)}(t+\Delta t)_{out} - \lambda_{eff}(t+\Delta t)$

Δt 0.5	$c_0(t)$	t		k_{11}	t		k_{21}	t		k_{31}	t		k_{41}	$c_0(t+\Delta t)$
t = 0	4.240													
0.5		0.000	4.240	10.422	0.250	6.646	4.714	0.250	5.418	6.935	0.500	7.707	1.501	7.208330066
(t + Δt)= 0.5	7.20833007													
1.0		0.5	7.208	2.586	0.750	7.855	-1.532	0.750	6.725	2.134	1.000	8.275	-1.825	7.305667006
(t + Δt)= 1.0	7.30566701													
1.5		1.0	7.306	0.011	1.250	7.308	-1.290	1.250	6.983	-0.657	1.500	6.977	-1.805	6.831633092
(t + Δt)= 1.5	6.83163309													
2.0		1.5	6.832	-1.590	1.750	6.434	-2.013	1.750	6.328	-1.725	2.000	5.968	-2.057	5.901457216
(t + Δt)= 2.0	5.90145722													
2.5		2	5.901	-1.990	2.250	5.404	-2.027	2.250	5.395	-1.909	2.500	4.949	-1.940	4.918269369
(t + Δt)= 2.5	4.91826937													
3.0		2.5	4.918	-1.887	2.750	4.448	-1.778	2.750	4.479	-1.736	3.000	4.050	-1.167	4.078267024
(t + Δt)= 3.0	4.07826702													
3.5		3	4.079	-1.679	3.250	3.658	-1.331	3.250	3.745	-1.378	3.500	3.789	-1.025	3.368043531
(t + Δt)= 3.5	3.36804353													
4.0		3.5	3.368	-1.417	3.750	3.014	-1.124	3.750	3.087	-1.299	4.000	2.713	-0.878	2.772960305
(t + Δt)= 4.0	2.77296031													
4.5		4	2.773	-1.141	4.250	2.488	-0.904	4.250	2.547	-1.036	4.500	2.256	-0.711	2.295308348
(t + Δt)= 4.5	2.29530835													
5.0		4.5	2.295	-0.903	4.750	2.069	-0.718	4.750	2.116	-0.820	5.000	1.885	-0.563	1.917118228
(t + Δt)= 5.0	1.91711823													
5.5		5	1.917	-0.715	5.250	1.738	-0.567	5.250	1.775	-0.651	5.500	1.581	-0.445	1.617317651
(t + Δt)= 5.1	1.61731765													
6.0		5.5	1.617	-1.341	5.750	1.582	-1.312	5.750	1.589	-1.318	6.000	1.258	-1.043	0.980338098
(t + Δt)= 5.2	0.98033381													
6.5		6	0.980	-0.813	6.250	1.316	-1.421	6.250	1.542	-1.295	6.500	1.270	-1.053	0.372125057
(t + Δt)= 5.3	0.37212506													
7.0		6.5	0.372	-0.309	6.750	1.849	-1.526	6.750	1.536	-1.273	7.000	1.290	-1.062	-0.208620585
(t + Δt)= 5.4	-0.20862059													
7.5		7	-0.209	0.173	7.250	1.962	-1.626	7.250	1.511	-1.253	7.500	1.291	-1.070	-0.783139781
(t + Δt)= 5.5	-0.78313978													
8.0		7.5	-0.783	0.833	7.750	2.075	-1.721	7.750	1.487	-1.233	8.000	1.301	-1.079	-1.29261546
(t + Δt)= 5.6	-1.29261546													
8.5		8	-1.293	1.072	8.250	2.185	-1.812	8.250	1.464	-1.214	8.500	1.310	-1.086	-1.798180063
(t + Δt)= 5.7	-1.79818006													

t	c
0	4.240
0.1	7.20833
0.2	7.305567
0.3	6.831633
0.4	5.901457
0.5	4.918269
0.6	4.078267
0.7	3.368044
0.8	2.77296
0.9	2.295308
1.0	1.917118
1.1	1.617318
1.2	0.980338
1.3	0.372125
1.4	-0.20862
1.5	-0.78314
1.6	-1.29262
1.7	-1.79818

Amonium



C1 1677
C2 1455

Danau	C (I) g/m³	W_s g/hari	Q_s m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ_s hari⁻¹
S Baru 2	1455.4	0	3381.408	15000	2	7500	0.01	0	0.2303272

Initial condition

t 0

c (I) = c_{awal} g/m³

$c_1(t)$ 1455.4 g/m³

$c_1(t + \Delta t) = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1(t)$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11}) = -\lambda_1 c_1 \quad (t + 1/2\ \Delta t\ k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21}) = -\lambda_1 c_1 \quad (t + 1/2\ \Delta t\ k_{21})$

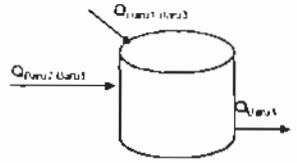
$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31}) = -\lambda_1 c_1 \quad (t + \Delta t\ k_{31})$

dt = 0.5 hr

t 0

$c_1(t)$ = 1455.4

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	1455.4													
0.5		0.000	1455.400	-335.364	0.250	1371.559	-316.045	0.250	1376.389	-317.157	0.500	1296.821	-298.823	1297.017455
(t + Δt) 0,5	1297.01745													
1.0		0.5	1297.01745	-298.868	0.750	1147.583	-264.434	0.750	1230.909	-283.635	1.000	1155.200	-266.190	1158.584436
(t + Δt)= 1,0	1158.58444													
1.5		1.0	1158.58444	-266.969	1.250	1091.842	-251.590	1.250	1095.687	-252.476	1.500	1032.346	-237.881	1032.502568
(t + Δt)= 1,5	1032.50257													
2.0		1.5	1032.50257	-237.917	1.750	973.023	-224.211	1.750	976.450	-225.001	2.000	920.002	-211.994	920.1414464
(t + Δt)= 2,0	920.14144													
2.5		2	920.14144	-212.026	2.250	867.135	-199.811	2.250	870.189	-200.515	2.500	819.884	-188.924	820.0079079
(t + Δt)= 2,5	820.0079079													
3.0		2.5	820.007908	-188.952	2.500	772.770	-178.067	2.500	775.491	-178.694	3.000	820.008	-188.952	729.0556463
(t + Δt)= 3,0	729.0556463													
3.5		3.0	729.055646	-167.994	3.000	729.056	-167.994	3.000	687.057	-158.317	3.500	729.056	-167.994	646.0714559
(t + Δt)= 3,5	646.0714559													
4.0		3.5	646.071456	-149.011	3.500	648.071	-149.011	3.500	609.419	-140.427	4.000	646.071	-149.011	573.596781
(t + Δt)= 4,0	573.596781													
4.5		4.0	573.596781	-132.172	4.000	573.597	-132.172	4.000	540.554	-124.558	4.500	573.597	-132.172	508.7796348
(t + Δt)= 4,5	508.7796348													
5.0		4.5	508.779635	-117.237	4.500	508.780	-117.237	4.500	479.470	-110.483	5.000	508.780	-117.237	451.2869063
(t + Δt)= 5,0	451.2869063													
		5.0	451.286906	-103.989	5.000	451.287	-103.989	5.000	425.290	-97.998	8.000	451.287	-103.989	400.2909273



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_3 hari⁻¹
S Baru 1	1877	0	12092 7899	10000	2	5000	0 01	0	1 214
S Baru2	1455 4	0	3381 408	15000	2	7500	0 01	0	0 730
S Baru3	1248	0	15473 6979	18750	2 5	7500	0 01	0	0 829

$dc_3/dt = W_3/V + Q_2/V_3 c_{2s} + Q_{3s}/V_3 c_{3s} - \lambda_3 c_3$

dt 0 5

Initial condition

t = 0

c (t) = c_{danau} g/m³

$c_3(t)$ = 1248 g/m³

$c_3(t + \Delta t) = c_3(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

$k_{23} = f(t, c(t)) = W_3/V + Q_2/V_3 c_{2s} + Q_{3s}/V_3 c_{3s} - \lambda_3 c_3$

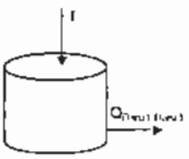
$k_{24} = f(t + 1/2\Delta t, c(t) + 1/2\Delta k_{23}) = W_3/(t + 1/2\ \Delta t) - \lambda_3 c_3 (t + 1/2\ \Delta t\ k_{23}) + Q_2/V_3 c_{2s} (t + 1/2\ \Delta t\ k_{23}) + Q_{3s}/V_3 c_{3s} (t + 1/2\ \Delta t\ k_{23})$

$k_{34} = f(t + 1/2\Delta t, c(t) + 1/2\Delta k_{24}) = W_3/(t + 1/2\ \Delta t) - \lambda_3 c_3 (t + 1/2\ \Delta t\ k_{24}) + Q_2/V_3 c_{2s} (t + 1/2\ \Delta t\ k_{24}) + Q_{3s}/V_3 c_{3s} (t + 1/2\ \Delta t\ k_{24})$

$k_{44} = f(t + \Delta t, c(t) + \Delta t\ k_{34}) = W_3/(t + \Delta t) - \lambda_3 c_3 (t + \Delta t\ k_{34})$

Δt 0.5	$c_3(t)$	f		k_{23}	f		k_{24}	f		k_{34}	f		k_{44}	$c_3(t + \Delta t)$
t = 0	1248 000													
0 5		0 000	1248 000	1321 047	0 250	1578 261	412.692	0 250	1351.173	788 959	0 500	1642 480	-12 708	1557 303155
(t + Δt)= 0,5	1557 303155													
1 0		0 5	1557.303	107.266	0 750	1584.119	-820 308	0 750	1402 226	89 021	1 000	1601 814	-553.162	1431 597198
(t + Δt)= 1,0	1431.5972													
1.5		1,0	1431.597	-268 868	1.250	1364 380	-427 649	1 250	1324 685	-333.312	1 500	1264 941	-473 733	1242 687093
(t + Δt)= 1,5	1242.68709													
2 0		1.5	1242 687	-439 435	1 750	1133 028	-470 564	1 750	1125 246	-430 304	2 000	1027 735	-456 811	1017 955192
(t + Δt)= 2,0	1017.95519													
2.5		2	1017.955	-441.155	2.250	907 666	-421.013	2 250	912.702	-408 479	2.500	814.718	-388 850	810.8726269
(t + Δt)= 2,5	810 872627													
3 0		2.5	810.873	-380 881	2.750	715 652	-344 955	2 750	724 634	-341 958	3 000	638 894	-739 095	644 7224504
(t + Δt)= 3,0	644.72245													
3.5		3	644.722	-317.258	3 250	565 408	-251 486	3 250	581 651	-290 689	3 500	499 378	-196.730	511.5276622
(t + Δt)= 3,5	511.527662													
4 0		3.5	511.528	-254 318	3 750	447 848	-201 564	3 750	461.129	-228 237	4 000	397 409	-159 684	405 3890216
(t + Δt)= 4,0	405.389022													
4 5		4	405 389	-195 923	4 250	359 408	-155 305	4 250	366 563	-174 498	4 500	318 148	-123 571	323.7974288
(t + Δt)= 4,5	323 79743													
5.0		4.5	323.797	-148 847	4 750	286 585	-117.989	4.750	294 300	-132 503	5 000	257 548	-93 907	261.8192269
(t + Δt)= 5,0	261.819227													
5.5		5	261 819	-113 125	5 250	233 538	-89 673	5 250	239 401	-101.083	5 500	211 779	-71 214	214 8653235
(t + Δt)= 5,1	214.865323													
6.0		5.5	214.865	-178 014	5 750	170 162	-141 109	5 750	179 388	-148 760	6 000	140 785	-116 334	141.8248354
(t + Δt)= 5,2	141.824835													
6.5		6	141.825	-117 610	6 250	112 422	-93 226	6 250	118 518	-98 280	6 500	92 884	-78 859	93 70066874
(t + Δt)= 5,3	93.7006687													
7.0		6 5	93 701	-77 703	6 750	74.275	-61 594	6 750	78 302	-64 853	7.000	61.234	-50 779	61 90604715
(t + Δt)= 5,4	61.9060472													
7.5		7	61.906	-51.336	7.250	49 072	-40 694	7.250	51 733	-42.900	7.500	40.456	-33 549	40 90001499
(t + Δt)= 5,5	40 900015													
8.0		7 5	40 900	-33 917	7 750	32 421	-26 885	7 750	34 179	-28 343	8 000	26 728	-22 165	27 02177417
(t + Δt)= 5,6	27 0217742													
8 5		8	27 022	-22.406	8 250	21.420	-17 763	8 250	22.581	-18 726	8 500	17.659	-14 644	17 85271423
(t + Δt)= 5,7	17 8527142													

1904



C1 9 23
C2 12 32

0 0316666667

Danau	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ_1 hari⁻¹
S Rawa1	9 23	0	12092 2899	10000	2	5000	0 01	0	1 21422899

initial condition

t = 0

c (t) c_{awal} g/m³

$c_1(t)$ 9 23 g/m³ $c_1(t + \Delta t)$ $c_1(t)$ + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) Δt

Steady k_{11} f(t, c(t)) = $-\lambda_1 c_1(t)$

dc_1/dt f(t, $c_1(t)$) $-\lambda_1 c_1$ k_{21} f(t + 1/2Δt,c(t)+1/2$\Delta t k_{11}$) = $-\lambda_1 c_1$ (t + 1/2 Δt λ_{11})

k_{31} = f(t + 1/2Δt,c(t)+1/2$\Delta t k_{21}$) = $-\lambda_1 c_1$ (t + 1/2 Δt k_{21})

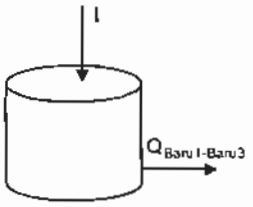
dt 0 5 hr k_{41} = f(t + Δt,c(t)+$\Delta t k_{31}$) = $-\lambda_1 c_1$ (t + Δt k_{31})

t = 0

$c_1(t)$ 9 23

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	9 23													
0.5		0 000	9.230	-11 207	0.250	6 428	-7.805	0 250	7 279	-8 838	0.500	4 811	-5 842	5.035
(t + Δt)	5.04													
1 000		0 5	5 035	-6.114	0.750	1 978	-2 402	0.750	4.435	-5.385	1.000	2 343	-2 845	2.991
(t + Δt)	3.19													
1.5000		1 000	3.191	-3 875	1.250	2 222	-2 698	1 250	2.516	-3 055	1 500	1 663	-2 020	1.741
(t + Δt)	1 74													
2 0000		1 500	1.741	-2.114	1.750	1.212	-1 472	1.750	1.373	-1.667	2.000	0.907	-1.102	0.950
(t + Δt)	0 95													
2.5000		2 000	0.950	-1.153	2.250	0 661	-0 803	2.250	0 749	-0.909	2.500	0 495	-0 601	0.518
(t + Δt)	0 52													
3 0000		2 500	0 518	-0 629	2 500	0 361	-0 438	2 500	0 409	-0 496	3 000	0 518	-0 629	0.258
(t + Δt)	0.28													
3 5000		3 000	0 258	-0.313	3 000	0 258	-0.313	3 000	0.179	-0 218	3 500	0 258	-0.313	0.117
(t + Δt)	0 12													
4 0000		3 500	0 117	-0 142	3 500	0.117	-0.142	3 500	0.081	-0 099	4 000	0.117	-0 142	0.053
(t + Δt)	0 05													
4 5000		4 000	0 053	-0 065	4 000	0 053	-0 065	4.000	0 037	-0 045	4 500	0 053	-0 065	0 024
(t + Δt)	0 02													
5 0000		4 500	0 024	-0 029	4 500	0 024	-0 029	4 500	0 017	-0 020	5 000	0 024	-0 029	0.011
(t + Δt)	0 01													
5 5000		5 000	0 011	-0 013	5 000	0 011	-0 013	5 000	0 008	-0 009	5 500	0 011	-0 013	0.005

Amonitum



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	vs m/har	k hari⁻¹	λ_i hari⁻¹
S. Baru1	2.72	0	12092	10000	2	5000	0	0	1.2092

initial condition

t = 0

c (t) = c_{Baru1} g/m³

$c_1(t)$ = 2.72 g/m³

$c_1(t + \Delta t) = c_1(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) = -\lambda_1 c_1$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta) = -\lambda_1 c_1\,(t + 1/2\,\Delta t\,k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta) = -\lambda_1 c_1\,(t + 1/2\,\Delta t\,k_{21})$

$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31}) = -\lambda_1 c_1\,(t + \Delta t\,k_{31})$

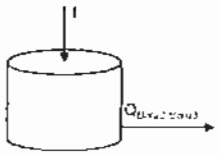
dt 0.5 hr

t 0

$c_1(t)$ 2.72

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	2 720													
0 5		0 000	2 720	-3 289	0.250	1.898	-2.295	0 250	2 146	-2 595	0.500	1.422	-1.720	1.488
(t + Δt)=0,5	1 488													
1.0		0 500	1.488	-1 799	0 750	0 588	-0 711	0 750	1 310	-1.584	1.000	0.696	-0.841	0.885
(t + Δt)= 1,0	0 885													
1 5		1 000	0 885	-1 070	1 250	0 617	-0 747	1 250	0 698	-0 845	1.500	0 463	-0.560	0.484
(t + Δt)= 1,5	0 484													
2 0		1.500	0 484	-0 585	1.750	0 338	-0.408	1 750	0 382	-0.462	2.000	0 253	-0.306	0.265
(t + Δt)= 2,0	0 265													
2.5		2 000	0 265	-0.320	2.250	0.165	-0.223	2.250	0.209	-0.253	2.500	0.138	-0.167	0.145
(t + Δt)= 2,5	0 145													
3 0		2 500	0.145	-0.175	2 500	0.101	-0.122	2.500	0.114	-0.138	3.000	0 145	-0.175	0.072
(t + Δt)= 3,0	0 072													
3.5		3.000	0.072	-0.087	3 000	0 072	-0.087	3.000	0.050	-0.061	3.500	0.072	-0.087	0.033
(t + Δt)= 3,5	0 033													
4.0		3.500	0 033	-0.040	3.500	0 033	-0 040	3 500	0 023	-0.028	4 000	0.033	-0 040	0.015
(t + Δt)= 4,0	0 015													
4 5		4.000	0 015	-0 018	4 000	0 015	-0 018	4.000	0.010	-0 013	4 500	0.015	-0.018	0.007
(t + Δt)= 4,5	0 007													
5.0		4.500	0.007	-0.008	4.500	0 007	-0.008	4 500	0 005	-0.006	5.000	0 007	-0.008	0 003
(t + Δt)= 5,0	0.003													
		5.000	0.003	-0 004	5 000	0 003	-0 004	5.000	0.002	-0.003	0.000	0.003	-0 004	0 001

Asumsi



C1 1 46
C2 0 8

Danau	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	va m/hari	k hari⁻¹	λ, hari⁻¹
S Buni 2	2 62	0	3381 408	15000	2	7500	0	0	0 2254272

initial condition

t = 0

c (t) c_{awal} g/m³

$c_1(t)$ = 2 62 g/m³ $c_1(t + \Delta t)$ $c_1(t)$ + 1/6 ($k_1 + 2k_2 + 2k_3 + k_4$) Δt

Steady

dc_1/dt $f(t, c_1(t))$ = $-\lambda_1 c_1$

$k_{11} = f(t, c(t))$ = $-\lambda_1 c_1(t)$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11})$ = $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{21})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21})$ = $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{21})$

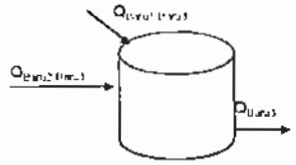
$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31})$ = $-\lambda_1 c_1$ $(t + \Delta t\ k_{31})$

dt 0 5 hr

t 0

$c_1(t)$ = 2 62

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	2 62													
0 5		0 000	7 620	-0 591	0 250	2.472	-0.557	0.250	2.481	-0.559	0 500	2 340	-0 528	2 340725407
(t + Δt)=0,5	2 340725411													
1.0		0 5	2.340725411	-0 528	0.750	2.077	-0.468	0.750	2.224	-0.501	1 000	2 090	-0 471	2 095912289
(t + Δt)= 1,0	2 095912289													
1 5		1 0	2 095912289	-0 472	1 250	1.978	-0.446	1.250	1.984	-0.447	1.500	1 872	-0 422	1 872501964
(t + Δt)= 1,5	1 872501964													
2 0		1 5	1 872501964	-0 422	1.750	1.767	-0.398	1.750	1.773	-0.400	2 000	1.673	-0.377	1 672905695
(t + Δt)= 2,0	1 6729057													
2 5		2	1 6729057	-0.377	2.250	1 579	-0.356	2.250	1.584	-0.357	2 500	1 494	-0.337	1 494585063
(t + Δt)= 2,5	1 494585063													
3 0		2 5	1.494585063	-0 337	2 500	1.410	-0.318	2.500	1.415	-0 319	3 000	1 495	-0 337	1 332275898
(t + Δt)= 3,0	1 332275898													
3 5		3 0	1.3322759	-0.300	3 000	1.332	-0.300	3 000	1.257	-0.283	3.500	1.332	-0.300	1.184931237
(t + Δt)= 3,5	1 184931737													
4 0		3 5	1.184931237	-0.267	3.500	1.186	-0.267	3 500	1.118	-0.252	4.000	1.185	-0 267	1 053882336
(t + Δt)= 4,0	1 053882336													
4 5		4 0	1 05388234	-0.238	4 000	1 054	-0.238	4 000	0.994	-0 224	4 500	1 054	-0 238	0 937326947
(t + Δt)= 4,5	0 937326947													
5 0		4 5	0.93732695	-0 211	4 500	0.937	-0.211	4.500	0 885	-0.199	5 000	0 937	-0 211	0 833662141
(t + Δt)= 5,0	0 833662141													
		5 0	0 83366214	-0.188	5 000	0 834	-0.188	5 000	0.787	-0 177	0 000	0 834	-0 188	0 741 46227



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_i hari⁻¹
S. Baru 1	2.72	0	12092.2899	10000	2	5000	0	0	1.209
S. Baru 2	2.82	0	3381.408	15000	2	7500	0	0	0.225
S. Baru 3	5.98	0	15473.6979	18750	2.5	7500	0	0	0.825

dc_i/dt = W_i/V + $Q_{i-1}/V_i c_{i-1}$ + $Q_{in}/V_i c_{in}$ − $\lambda_i c_i$

Δt 0.5

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_i(t)$ = 5.98 g/m³

$c_i(t+\Delta t)$ = $c_i(t)$ + 1/6 (k_{i1} + 2k_{i2} + 2k_{i3} + k_{i4}) Δt

k_{i1} = f(t, c(t)) = W_i/V + $Q_{i-1}/V_i c_{i-1}$ + $Q_{in}/V_i c_{in}$ − $\lambda_i c_i$

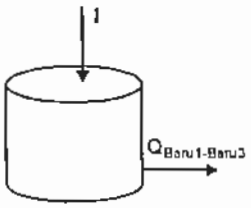
k_{i2} = f(t + 1/2Δt, c(t) + 1/2$\Delta t k_{i1}$) = W_i/V + $Q_{i-1}/V_i c_{i-1}$ (t + 1/2 Δt k_{i1}) + $Q_{in}/V_i c_{in}$ (t + 1/2 Δt k_{i1}) − λ_i (t + 1/2 Δt k_{i1})

k_{i3} = f(t + 1/2Δt, c(t) + 1/2$\Delta t k_{i2}$) = W_i/V + $Q_{i-1}/V_i c_{i-1}$ (t + 1/2 Δt k_{i2}) + $Q_{in}/V_i c_{in}$ (t + 1/2 Δt k_{i2}) − λ_i (t + 1/2 Δt k_{i2})

k_{i4} = f(t + Δt, c(t) + $\Delta t k_{i3}$) = W_i/V + $Q_{i-1}/V_i c_{i-1}$ (t + Δt k_{i3}) + $Q_{in}/V_i c_{in}$ (t + Δt k_{i3}) − λ_i (t + Δt k_{i3})

Δt 0.5	$c_i(t)$	f		k_{i1}	f		k_{i2}	f		k_{i3}	f		k_{i4}	$c_i(t+\Delta t)$
t = 0	5.980													
0.5		0.000	5.980	-1.039	0.250	5.700	-1.852	0.250	5.497	-1.382	0.500	5.269	-2.101	5.159357328
(t + Δt)=0,5	5.15935733													
1.0		0.5	5.158	-3.134	0.750	4.376	-2.432	0.750	4.551	-1.671	1.000	4.324	-2.258	4.026386823
(t + Δt)= 1.0	4.02638682													
1.5		1.0	4.026	-2.807	1.250	3.375	-1.592	1.250	3.628	-1.702	1.500	3.175	-1.639	3.123428527
(t + Δt)= 1.5	3.12342853													
2.0		1.5	3.123	-2.138	1.750	2.589	-1.330	1.750	2.781	-1.442	2.000	2.403	-1.300	2.375045339
(t + Δt)= 2.0	2.37504534													
2.5		2	2.375	-1.678	2.250	1.958	-1.036	2.250	2.116	-1.137	2.500	1.807	-0.987	1.791185411
(t + Δt)= 2.5	1.79118541													
3.0		2.5	1.791	-1.284	2.750	1.470	-0.773	2.750	1.598	-0.862	3.000	1.360	-0.811	1.360849525
(t + Δt)= 3.0	1.36084952													
3.5		3	1.361	-0.987	3.250	1.114	-0.532	3.250	1.228	-0.669	3.500	1.026	-0.459	1.040214313
(t + Δt)= 3.5	1.04021431													
4.0		3.5	1.040	-0.757	3.750	0.851	-0.395	3.750	0.941	-0.497	4.000	0.782	-0.348	0.799522905
(t + Δt)= 4.0	0.7995229													
4.5		4	0.800	-0.579	4.250	0.655	-0.295	4.250	0.728	-0.364	4.500	0.617	-0.254	0.621875303
(t + Δt)= 4.5	0.6218753													
5.0		4.5	0.622	-0.446	4.750	0.510	-0.203	4.750	0.572	-0.267	5.000	0.489	-0.184	0.491471377
(t + Δt)= 5.0	0.49147138													
5.5		5	0.491	-0.348	5.250	0.405	-0.142	5.250	0.456	-0.196	5.500	0.393	-0.133	0.395017689
(t + Δt)= 5.1	0.39501769													
6.0		5.5	0.395	-0.326	5.750	0.314	-0.259	5.750	0.330	-0.273	6.000	0.259	-0.214	0.261501343
(t + Δt)= 5.2	0.26150134													
6.5		6	0.262	-0.216	6.250	0.208	-0.171	6.250	0.219	-0.180	6.500	0.171	-0.141	0.173113646
(t + Δt)= 5.3	0.17311365													
7.0		6.5	0.173	-0.143	6.750	0.137	-0.113	6.750	0.145	-0.119	7.000	0.113	-0.094	0.114601073
(t + Δt)= 5.4	0.11460107													
7.5		7	0.115	-0.095	7.250	0.091	-0.075	7.250	0.096	-0.079	7.500	0.075	-0.062	0.075865804
(t + Δt)= 5.5	0.0758658													
8.0		7.5	0.076	-0.063	7.750	0.060	-0.050	7.750	0.063	-0.052	8.000	0.050	-0.041	0.050223092
(t + Δt)= 5.6	0.05022309													
8.5		8	0.050	-0.041	8.250	0.040	-0.033	8.250	0.042	-0.035	8.500	0.033	-0.027	0.03324764
(t + Δt)= 5.7	0.03324764													

Amonium



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_1 g/hari	Q_i m³/hari	V m³	H m	A m²	vs m/har	k hari⁻¹	λ_1 hari⁻¹
S. Baru1	2.62	0	12092	10000	2	5000	0.01	0	1.2142

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_1(t)$ = 2.62 g/m³ $c_1(t+/ = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady $k_{11} = f(t, c(t)) = \lambda_1 c_1(t)$

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$ $k_{21} = f(t+ 1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{21})$

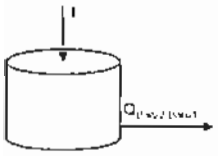
dt 0.5 hr $k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31}) = -\lambda_1 c_1 (t + \Delta t\, k_{31})$

t 0

$c_1(t)$ 2.62

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	2.620													
0.5		0.000	2.620	-3.181	0.250	1.825	-2.216	0.250	2.066	-2.509	0.500	1.366	-1.658	1.429
(t + Δt)=0,5	1.429													
1.0		0.500	1.429	-1.736	0.750	0.562	-0.682	0.750	1.259	-1.529	1.000	0.665	-0.808	0.849
(t + Δt)= 1,0	0.849													
1.5		1.000	0.849	-1.031	1.250	0.591	-0.718	1.250	0.670	-0.813	1.500	0.443	-0.537	0.463
(t + Δt)= 1,5	0.463													
2.0		1.500	0.463	-0.562	1.750	0.323	-0.392	1.750	0.365	-0.443	2.000	0.241	-0.293	0.253
(t + Δt)= 2,0	0.253													
2.5		2.000	0.253	-0.307	2.250	0.176	-0.214	2.250	0.199	-0.242	2.500	0.132	-0.160	0.138
(t + Δt)= 2,5	0.138													
3.0		2.500	0.138	-0.167	2.500	0.096	-0.117	2.500	0.109	-0.132	3.000	0.138	-0.167	0.069
(t + Δt)= 3,0	0.069													
3.5		3.000	0.069	-0.083	3.000	0.069	-0.083	3.000	0.048	-0.058	3.500	0.069	-0.083	0.031
(t + Δt)= 3,5	0.031													
4.0		3.500	0.031	-0.038	3.500	0.031	-0.038	3.500	0.022	-0.026	4.000	0.031	-0.038	0.014
(t + Δt)= 4,0	0.014													
4.5		4.000	0.014	-0.017	4.000	0.014	-0.017	4.000	0.010	-0.012	4.500	0.014	-0.017	0.006
(t + Δt)= 4,5	0.006													
5.0		4.500	0.006	-0.008	4.500	0.006	-0.008	4.500	0.004	-0.005	5.000	0.006	-0.008	0.003
(t + Δt)= 5,0	0.003													
		5.000	0.003	-0.004	5.000	0.003	-0.004	5.000	0.002	-0.002	0.000	0.003	-0.004	0.001

Amonium



C1 1677
C2 1455

Daerah	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ_1 hari⁻¹
S Barat 2	1455.4	0	3381.408	15000	2	7500	0.01	0	0.2304272

initial condition

t 0

c (t) c_{awal} g/m³

$c_1(t)$ 1455.4 g/m³

$c_1(t + \Delta t) = c_1(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) = -\lambda_1 c_1$

$k_{11} = f(t, c(t))$ $= -\lambda_1 c_1$

$k_{21} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11})$ $= -\lambda_1 c_1 \; (t + 1/2\,\Delta t, k_{11})$

$k_{31} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21})$ $= -\lambda_1 c_1 \; (t + 1/2\,\Delta t\, k_{21})$

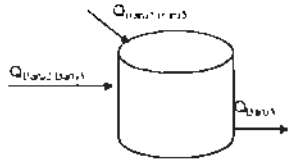
$k_{41} = f(t + \Delta t, c(t) + \Delta t k_{31})$ $= -\lambda_1 c_1 \; (t + \Delta t\, k_{31})$

dt 0.5 hr

t 0

$c_1(t)$ 1455.4

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	1455.4													
0.5		0.000	1455.400	-335.364	0.250	1371.559	-316.045	0.250	1376.389	-317.157	0.500	1296.821	-298.823	1297.017455
(t + Δt)= 0,5	1297.017455													
1.0		0.5	1297.017455	-298.868	0.750	1147.583	-264.434	0.750	1230.909	-283.635	1.000	1155.200	-266.190	1158.584436
(t + Δt)= 1,0	1158.584436													
1.5		1.0	1158.584436	-266.969	1.250	1091.842	-251.590	1.250	1095.657	-252.476	1.500	1032.346	-237.881	1032.502568
(t + Δt)= 1,5	1032.502568													
2.0		1.5	1032.502568	-237.917	1.750	973.023	-224.211	1.750	976.450	-225.001	2.000	920.002	-211.994	920.1414404
(t + Δt) 2,0	920.1414404													
2.5		2	920.141404	-212.026	2.250	867.135	-199.811	2.250	870.189	-200.515	2.500	819.884	-188.924	820.0079079
(t + Δt)= 2,5	820.0079079													
3.0		2.5	820.007908	-188.952	2.500	772.770	-178.067	2.500	775.491	-178.694	3.000	820.008	-188.952	729.0556463
(t + Δt)= 3,0	729.0556463													
3.5		3.0	729.055646	-167.994	3.000	729.056	-167.994	3.000	687.057	-158.317	3.500	729.056	-167.994	646.0714559
(t + Δt)= 3,5	646.0714559													
4.0		3.5	646.071456	-149.011	3.500	648.071	-149.011	3.500	609.419	-140.427	4.000	648.071	-149.011	573.5967781
(t + Δt)= 4,0	573.5967781													
4.5		4.0	573.596781	-132.172	4.000	573.597	-132.172	4.000	540.554	-124.558	4.500	573.597	-132.172	508.7796348
(t + Δt)= 4,5	508.7796348													
5.0		4.5	508.779635	-117.237	4.500	508.780	-117.237	4.500	479.470	-110.483	5.000	508.780	-117.237	451.2869063
(t + Δt)= 5,0	451.2869063													
		5.0	451.286906	-103.989	5.000	451.287	-103.989	5.000	425.290	-97.998	0.000	451.287	-103.989	400.2909273



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_1 hari⁻¹
S Baru 1	1677	0	12093 2899	10000	2	5000	0 01	0	1 214
S Baru2	1455 4	0	3381 408	15000	2	7500	0 01	0	0 230
S Baru3	1248	0	15473 6979	18750	2 5	7500	0 01	0	0 829

dc_s/dt - W_s/V + $Q_{s1}/V_s c_{s1}$ + $Q_{s2}/V_s c_{s2}$ - $\lambda_s c_s$

dt 0 5

Initial condition

t = 0

c (t) = c_{danau} g/m³

$c_s(0)$ - 1248 g/m³

$c_s(t + \Delta t)$ - $c_s(t)$ + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) Δt

k_{1s} = f(t, c(t)) W_s/V + $Q_{s1}/V_s c_{s1}$ + $Q_{s2}/V_s c_{s2}$ - $\lambda_s c_s$

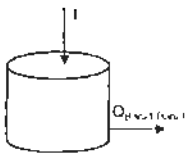
k_{2s} = f(t + 1/2Δt, c(t) + 1/2Δk_1) - W_s/V + $Q_{s1}/V_s c_{s1}$ + Q_{s2}/V_s (1 + 1/2 Δt k_{1s}) - λ_s (1 + 1/2 Δt k_{1s})

k_{3s} = f(t + 1/2Δt, c(t) + 1/2Δk_2) - W_s/V + $Q_{s1}/V_s c_{s1}$ + Q_{s2}/V_s (1 + 1/2 Δt k_{2s}) - λ_s (1 + 1/2 Δt k_{2s})

k_{4s} = f(t + Δt, c(t) + Δk_{3s}) - W_s/V + $Q_{s1}/V_s c_{s1}$ + Q_{s2}/V_s (1 + Δt k_{3s}) - λ_s (1 + Δt k_{3s})

Δt 0.5	$c_s(t)$	f		k_{1s}	f		k_{2s}	f		k_{3s}	f		k_{4s}	$c_s(t + \Delta t)$
t = 0	1248 000													
0 5		0 000	1248 000	1321 042	0 250	1578 261	412 692	0 250	1351 173	788 959	0 500	1642 480	-12 708	1557 303155
(t + Δt)=0,5	1557 30315													
1 0		0 5	1557 303	107.265	0 750	1584 119	-620 308	0 750	1402 226	89 021	1 000	1601 814	-553 162	1431 597198
(t + Δt)= 1,0	1431.5972													
1 5		1 0	1431.597	-268 868	1 250	1364 380	-427 649	1 250	1324 685	-333 312	1 500	1264 841	-473 733	1242 887093
(t + Δt)= 1,5	1242 88709													
7 0		1.5	1242 887	-439 435	1.750	1133 028	-470 564	1 750	1125 248	-430 304	2.000	1027 735	-458 011	1017.955192
(t + Δt)= 2,0	1017.95519													
2.5		2	1017.955	-441 155	2.250	907.866	-421.013	2.250	912.702	-408.479	2.500	814 716	-388 850	810.8726269
(t + Δt)= 2,5	810 872627													
3.0		2.5	810 873	-380 881	2 750	715 652	-344 955	2 750	724 834	-341 958	3 000	639 894	-239 095	644 7224504
(t + Δt)= 3,0	644.72245													
3.5		3	644 722	-317 258	3 250	565 408	-251 486	3 250	581 851	-250 689	3 500	459 378	-196 750	511.5278822
(t + Δt)= 3,5	511.527882													
4 0		3 5	511 528	-254 318	3 750	447 948	-201 594	3 750	461 129	-228 237	4 000	397 409	-150 884	405 3890218
(t + Δt)= 4,0	405.389022													
4.5		4	405 389	-195 923	4 250	358 408	-155 305	4 250	368 563	-174 498	4 500	318 140	-123 571	323.7974288
(t + Δt)= 4,5	323 79743													
5 0		4 5	323 797	-148 847	4 750	286 586	-117 989	4.750	294 300	-132 503	5 000	257 546	-93 907	261.8192269
(t + Δt)= 5,0	261.819227													
5.5		5	261 819	-113 125	5 250	233 538	-89 673	5 250	239 401	-101 081	5 500	211.279	-71.214	214 6653235
(t + Δt)= 5,1	214 665323													
6 0		5 5	214 665	-178 014	5 750	170 162	-141 109	5 750	179 389	-148 760	6 000	140 285	-116 334	141.8248354
(t + Δt)= 5,2	141 824835													
6 5		6	141 825	-117 810	6 250	112.422	-93 228	6 250	118 518	-98 263	6 500	92 684	-76 859	93 70068674
(t + Δt)= 5,3	93.7006867													
7 0		6 5	93 701	-77 703	6 750	74 275	-61 564	6 750	78 302	-64 933	7 000	61 234	-50 779	61 90604715
(t + Δt)= 5,4	61.9060472													
7.5		7	61.906	-51 336	7 250	49 077	-40 694	7 250	51 733	-42 900	7 500	40 456	-33 549	40 90001499
(t + Δt)= 5,5	40 900015													
8.0		7.5	40 900	-33 917	7 750	32.421	-26 885	7 750	34 179	-28 343	8 000	26 729	-22 165	27 02177417
(t + Δt)= 5,6	27 0217742													
8.5		8	27 022	-22.408	8 250	21 470	-17 763	8 250	22 561	-18 726	8 500	17 659	-14 644	17 85271423
(t + Δt)= 5,7	17 8527142													

1934



C1 9 23
C2 12 32

0 041666667

Danau	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	Vs m/hari	k hari⁻¹	λ, hari⁻¹
S Danau	9 23	0	12092 2899	10000	2	5000	0 01	0	1 21422899

Initial condition

t = 0

c (t) c_{awal} g/m³

$c_1(t)$ - 9 23 g/m³

$c_1(t + \Delta t)$ $c_1(t)$ + $1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

dc_1/dt $f(t, c_1(t))$ - $-\lambda_1 c_1$

dt 0 5 hr

t 0

$c_1(t)$ 9 23

k_{11} $f(t, c(t))$ $-\lambda_1 c_1(t)$

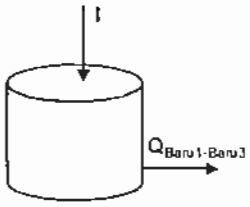
k_{21} = $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{11})$

k_{31} = $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{21})$

k_{41} = $f(t + \Delta t, c(t) + \Delta t k_{31})$ $-\lambda_1 c_1$ $(t + \Delta t\ k_{31})$

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	9 23													
0 5		0 000	9 230	-11 207	0 250	6 428	-7 805	0 250	7 279	-8 838	0.500	4 811	-5 842	5.035
(t + Δt)	5 04													
1 000		0 5	5 035	-6 114	0.750	1 978	-2 402	0 750	4 435	-5.385	1.000	2.343	-2 845	2.991
(t + Δt)	3 19													
1 5000		1 000	3 191	-3 875	1 250	2 222	-2 698	1 250	2.516	-3 055	1 500	1 663	-2 020	1.741
(t + Δt)	1 74													
2 0000		1 500	1 741	-2 114	1.750	1 212	-1 472	1 750	1.373	-1.667	2.000	0.907	-1.102	0.950
(t + Δt)	0 95													
2 5000		2 000	0 950	-1 153	2 250	0 661	-0 803	2 250	0.749	-0.909	2.500	0 495	-0 601	0.518
(t + Δt)	0 52													
3 0000		2 500	0.518	-0 629	2 500	0.361	-0 438	2 500	0.409	-0 496	3 000	0 518	-0 629	0.258
(t + Δt)	0 26													
3 5000		3 000	0 258	-0.313	3 000	0 258	-0.313	3 000	0.179	-0 218	3 500	0 258	-0.313	0.117
(t + Δt)	0 12													
4 0000		3 500	0 117	-0.142	3 500	0.117	-0.142	3 500	0.081	-0 099	4 000	0 117	-0 142	0 053
(t + Δt)	0 05													
4 5000		4 000	0 053	-0 065	4 000	0.053	-0 065	4 000	0 037	-0 045	4 500	0 053	-0 065	0.024
(t + Δt)	0 02													
5 0000		4 500	0 024	-0 029	4 500	0.024	-0 029	4 500	0 017	-0 020	5 000	0 024	-0 029	0.011
(t + Δt)	0 01													
5 5000		5 000	0 011	-0 013	5 000	0 011	-0 013	5 000	0.008	-0 009	5 500	0 011	-0 013	0.005

Amonium



C1 1.46
C2 0.8

Danau	C (t) g/m^3	W_i g/hari	Q_i m^3/hari	V m^3	H m	A m^2	vs m/har	k $hari^{-1}$	λ_s $hari^{-1}$
S. Baru1	2.72	0	12092	10000	2	5000	0	0	1.2092

initial condition

t = 0

$c(t) = c_{danau}$ g/m^3

$c_1(t) = 2.72$ g/m^3

$c_1(t+\Delta t) - c_1(t) = 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$dc_1/dt = f(t, c_1(t)) - \lambda_1 c_1$

$k_{11} = f(t, c(t)) \quad \lambda_1 c_1(t)$

$k_{21} = f(t+1/2\Delta t, c(t)+1/2\Delta \quad (t + 1/2\,\Delta t\, k_{11})$

$k_{31} = f(t+1/2\Delta t, c(t)+1/2\Delta - \lambda_1 c_1 \quad (t + 1/2\,\Delta t\, k_{21})$

$k_{41} = f(t+\Delta t, c(t)+\Delta t k_{31}) - \lambda_1 c_1 \quad (t + \Delta t\, k_{31})$

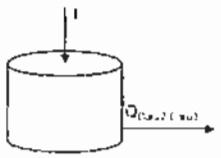
dt 0.5 hr

t 0

$c_1(t)$ 2.72

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	2 720													
0 5		0 000	2.720	-3 289	0 250	1 698	-2 295	0 250	2 146	-2 595	0 500	1.422	-1 720	1 488
(t + Δt)=0,5	1 488													
1 0		0 500	1.488	-1 799	0 750	0 588	-0 711	0.750	1 310	-1.584	1.000	0 696	-0.841	0.885
(t + Δt)= 1,0	0 885													
1.5		1 000	0 885	-1.070	1.250	0 617	-0 747	1 250	0.698	-0 845	1 500	0 463	-0.560	0.484
(t + Δt)= 1,5	0 484													
2 0		1 500	0 484	-0 585	1.750	0.338	-0 408	1 750	0 382	-0 462	2.000	0.253	-0.306	0.265
(t + Δt)= 2,0	0 265													
2 5		2 000	0 265	-0 320	2 250	0.185	-0.223	2.250	0 209	-0 253	2.500	0.138	-0.167	0.145
(t + Δt)= 2,5	0 145													
3 0		2.500	0 145	-0.175	2.500	0.101	-0 122	2 500	0.114	-0.138	3.000	0 145	-0.175	0.072
(t + Δt)= 3,0	0 072													
3 5		3 000	0.072	-0 087	3.000	0.072	-0 087	3.000	0.050	-0 061	3 500	0 072	-0 087	0.033
(t + Δt)= 3,5	0 033													
4 0		3.500	0 033	-0 040	3.500	0.033	-0 040	3 500	0.023	-0.028	4.000	0 033	-0.040	0.015
(t + Δt)= 4,0	0 015													
4 5		4.000	0 015	-0 018	4.000	0 015	-0 018	4 000	0.010	-0 013	4 500	0.015	-0 018	0.007
(t + Δt)= 4,5	0 007													
5 0		4 500	0 007	-0 008	4.500	0.007	-0 008	4 500	0.005	-0.006	5.000	0.007	-0 008	0.003
(t + Δt)= 5,0	0 003													
		5.000	0 003	-0.004	5.000	0.003	-0.004	5.000	0.002	-0.003	0.000	0.003	-0.004	0 001

Ammonium



C1 1.46
C2 0.8

Danau	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ_1 hari⁻¹
S Rawa 2	2.62	0	3381.408	15000	2	7500	0	0	0.2254272

initial condition

t 0

$c_1(t)$ - $c_{1,in}$ g/m³

$c_1(t)$ 2.62 g/m³

Steady

dc_1/dt $f(t, c_1(t))$ $-\lambda_1 c_1$

dt - 0.5 hr

t 0

$c_1(t)$ - 2.62

$c_1(t + \Delta t)$ $c_1(t)$ + 1/6 $(k_1 + 2k_2 + 2k_3 + k_4)\Delta t$

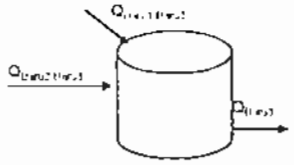
k_{11} $f(t, c(t))$ = $-\lambda_1 c_1(t)$

k_{21} = $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{11})$

k_{31} = $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{21})$

k_{41} = $f(t + \Delta t, c(t) + \Delta t k_{31})$ $-\lambda_1 c_1$ $(t + \Delta t\ k_{31})$

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
t = 0	2.62													
0.5		0.000	2.620	-0.591	0.250	2.472	-0.557	0.250	2.481	-0.559	0.500	2.340	-0.528	2.340725407
(t + Δt)=0,5	2.34072541													
1.0		0.5	2.340725411	-0.528	0.750	2.077	-0.468	0.750	2.224	-0.501	1.000	2.090	-0.471	2.095912289
(t + Δt)= 1,0	2.095912289													
1.5		1.0	2.095912289	-0.472	1.250	1.978	-0.446	1.250	1.984	-0.447	1.500	1.872	-0.422	1.872501964
(t + Δt) = 1,5	1.87250196													
2.0		1.5	1.872501964	-0.422	1.750	1.767	-0.398	1.750	1.773	-0.400	2.000	1.673	-0.377	1.672905695
(t + Δt)= 2,0	1.6729057													
2.5		2	1.672905695	-0.377	2.250	1.579	-0.356	2.250	1.584	-0.357	2.500	1.494	-0.337	1.494585063
(t + Δt)= 2,5	1.494585063													
3.0		2.5	1.494585063	-0.337	2.500	1.410	-0.318	2.500	1.415	-0.319	3.000	1.495	-0.337	1.332275898
(t + Δt)= 3,0	1.332275898													
3.5		3.0	1.332275898	-0.300	3.000	1.332	-0.300	3.000	1.257	-0.283	3.500	1.332	-0.300	1.184931237
(t + Δt)= 3,5	1.184931237													
4.0		3.5	1.184931237	-0.267	3.500	1.185	-0.267	3.500	1.118	-0.252	4.000	1.185	-0.267	1.053882336
(t + Δt)= 4,0	1.053882336													
4.5		4.0	1.053882336	-0.238	4.000	1.054	-0.238	4.000	0.994	-0.224	4.500	1.054	-0.238	0.937326947
(t + Δt)= 4,5	0.937326947													
5.0		4.5	0.937326947	-0.211	4.500	0.937	-0.211	4.500	0.885	-0.199	5.000	0.937	-0.211	0.833662141
(t + Δt)= 5,0	0.833662141													
		5.0	0.833662141	-0.188	5.000	0.834	-0.188	5.000	0.787	-0.177	0.000	0.834	-0.188	0.741146227



Danau	C (t) g/m³	W_t g/hari	Q_t m³/hari	V m³	H m	A m²	r m/hari	k hari⁻¹	λ_t hari⁻¹
S Baru 1	2 72	0	12092 2899	10000	2	5000	0	0	1 209
S Baru 2	2 82	0	3381 408	15000	2	7500	0	0	0 225
S Baru 3	5 98	0	15473 6979	18750	2 5	7500	0	0	0 825

dc_1/dt = W_1/V + $Q_{1,2}/V_1 c_{1,2}$ + $Q_{3,4}/V_1 c_{3,4}$ - $\lambda_1 c_1$

dt = 0 5

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_1(t)$ = 5 96 g/m³

$c_1(t + \Delta t)$ = $c_1(t)$ + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) Δt

k_{11} = f(t, c(t)) = W_1/V + $Q_{1,2}/V_1 c_{1,2}$ + $Q_{3,4}/V_1 c_{3,4}$ - $\lambda_1 c_1$

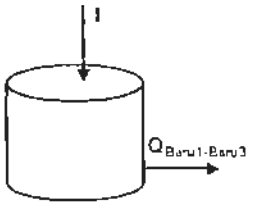
k_{12} = f(t+ 1/2Δt, c(t)+ 1/2$\Delta$$k_1$ = W_1/V + $Q_{1,2}/V_1 c_{1,2}$ + $Q_{3,4}/V_1 c_{3,4}$ - λ_1 (t + 1/2 Δt, k_{11} + 1/2 Δt k_{11})

k_{13} = f(t+ 1/2Δt, c(t)+ 1/2$\Delta$$k_2$ = W_1/V + $Q_{1,2}/V_1 c_{1,2}$ + $Q_{3,4}/V_1 c_{3,4}$ - λ_1 (t + 1/2 Δt, k_{12} + 1/2 Δt k_{12})

k_{14} = f(t+ Δt, c(t)+ $\Delta$$k_{13}$) = W_1/V + $Q_{1,2}/V_1 c_{1,2}$ + $Q_{3,4}/V_1 c_{3,4}$ - λ_1 (t + Δt, k_{13})

Δt 0.5	$c_1(t)$	t	k_{14}	t	k_{24}	t	k_{34}	t	k_{44}	$c_1(t + \Delta t)$
t = 0	5 960									
0 5		0 000	5 960	-1 039	0 250	5 700	-1 852	0 250	5 497	-1 382	0 500	5 269	-2 101	5 159357328
(t + Δt)=0,5	5 15935733									
1 0		0 5	5 159	-3 134	0 750	4 378	-2 432	0 750	4 551	-1 671	1 000	4 324	-2 258	4 026388623
(t + Δt)= 1,0	4 02638662									
1 5		1.0	4 028	-2 607	1 250	3 375	-1 597	1 250	3 628	-1 702	1 500	3 175	-1 639	3 123428527
(t + Δt)= 1,5	3.12342853									
2 0		1.5	3.123	-2.138	1.750	2.589	-1 330	1 750	2 791	-1 442	2 000	2 403	-1 300	2 375045339
(t + Δt)= 2,0	2.3750x534									
2 5		2	2 375	-1.678	2.250	1.956	-1.035	2.250	2.116	-1 137	2 500	1 807	-0 987	1 791185411
(t + Δt)= 2,5	1.79118541									
3 0		2 5	1 791	-1.284	2.750	1 470	-0 773	2 750	1 598	-0 862	3 000	1 360	-0 811	1 360849525
(t + Δt)= 3,0	1 36084952									
3 5		3	1.361	-0 987	3.250	1 114	-0 532	3.250	1 228	-0 668	3 500	1 028	-0 459	1 040214313
(t + Δt)= 3,5	1 04021431									
4 0		3 5	1.040	-0 757	3.750	0 851	-0 395	3 750	0 943	-0 497	4 000	0 792	-0 348	0 799572905
(t + Δt)= 4,0	0.7995729									
4 5		4	0 800	-0.579	4 250	0 655	-0 295	4.250	0 726	-0 364	4 500	0 617	-0 254	0 621875303
(t + Δt)= 4,5	0 6218753									
5 0		4 5	0 622	-0 448	4 750	0 510	-0 202	4 750	0 572	-0 267	5 000	0 489	-0 184	0 491471377
(t + Δt)= 5,0	0 49147138									
5 5		5	0 491	-0 348	5 250	0 405	-0 142	5 250	0 456	-0 198	5 500	0 393	-0 133	0 395017689
(t + Δt)= 5,1	0 39501769									
6 0		5 5	0 395	-0 326	5 750	0 314	-0 258	5 750	0 330	-0 773	6 000	0 258	-0 214	0 261501343
(t + Δt)= 5,2	0 26150134									
6 5		6	0 262	-0 218	6.250	0 208	-0.171	6 250	0 219	-0 180	6 500	0 171	-0 141	0 173113646
(t + Δt)= 5,3	0.17311365									
7 0		6 5	0 173	-0 143	6 750	0 137	-0 113	6 750	0 145	-0 119	7 000	0 113	-0 094	0 114601073
(t + Δt)= 5,4	0.11460107									
7 5		7	0.115	-0 095	7 250	0 091	-0 075	7 250	0 096	-0 079	7 500	0 075	-0 062	0 075885804
(t + Δt)= 5,5	0.0758858									
8 0		7 5	0 076	-0 063	7 750	0 060	-0 050	7 750	0 063	-0 052	8 000	0 050	-0 041	0 050223092
(t + Δt)= 5,6	0 05022309									
8 5		8	0 050	-0 041	8 250	0 040	-0 033	8 250	0 042	-0 035	8 500	0 033	-0 027	0 03324784
(t + Δt)= 5,7	0.03324784									

Amonium



C1 1.46
C2 0.8

Danau	C (I) g/m³	W_I g/hari	Q_I m³/hari	V m³	H m	A m²	vs m/har	k hari⁻¹	λ_I hari⁻¹
S. Baru1	2.62	0	12092	10000	2	5000	0.01	0	1.2142

initial condition

t = 0

$c_I(t) = c_{danau}$ g/m³

$c_I(t) = 2.62$ g/m³

$c_I(t+\ell) = c_I(t) + 1/6\,(k_1 + 2k_2 + 2k_3 + k_4)\,\Delta t$

Steady

$k_{11} = f(t, c(t)) = -\lambda_1 c_I(t)$

$dc_I/dt = -f(t, c_I(t)) = -\lambda_1 c_I$

$k_{21} = f(t+1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_I\ (t+1/2\,\Delta t\,k_{11})$

$k_{31} = f(t+1/2\Delta t, c(t)+1/2\Delta = -\lambda_1 c_I\ (t+1/2\,\Delta t\,k_{21})$

$k_{41} = f(t+\Delta t, c(t)+\Delta t k_{31}) = -\lambda_1 c_I\ (t+\Delta t\,k_{31})$

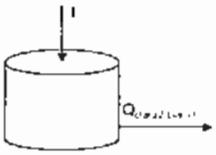
dt 0.5 hr

t 0

$c_I(t)$ 2.62

Δt 0.5	$c_I(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_I(t+\Delta t)$
t = 0	2.620													
0.5		0.000	2.620	-3.181	0.250	1.825	-2.216	0.250	2.066	-2.509	0.500	1.366	-1.658	1.429
(t + Δt)=0,5	1.429													
1.0		0.500	1.429	-1.736	0.750	0.562	-0.682	0.750	1.259	-1.529	1.000	0.665	-0.808	0.849
(t + Δt)= 1,0	0.849													
1.5		1.000	0.849	-1.031	1.250	0.591	-0.718	1.250	0.670	-0.813	1.500	0.443	-0.537	0.463
(t + Δt)= 1,5	0.463													
2.0		1.500	0.463	-0.562	1.750	0.323	-0.392	1.750	0.365	-0.443	2.000	0.241	-0.293	0.253
(t + Δt)= 2,0	0.253													
2.5		2.000	0.253	-0.307	2.250	0.176	-0.214	2.250	0.199	-0.242	2.500	0.132	-0.160	0.138
(t + Δt)= 2,5	0.138													
3.0		2.500	0.138	-0.167	2.500	0.096	-0.117	2.500	0.109	-0.132	3.000	0.138	-0.167	0.069
(t + Δt)= 3,0	0.069													
3.5		3.000	0.069	-0.083	3.000	0.069	-0.083	3.000	0.048	-0.058	3.500	0.069	-0.083	0.031
(t + Δt)= 3,5	0.031													
4.0		3.500	0.031	-0.038	3.500	0.031	-0.038	3.500	0.022	-0.026	4.000	0.031	-0.038	0.014
(t + Δt)= 4,0	0.014													
4.5		4.000	0.014	-0.017	4.000	0.014	-0.017	4.000	0.010	-0.012	4.500	0.014	-0.017	0.006
(t + Δt)= 4,5	0.006													
5.0		4.500	0.006	-0.008	4.500	0.006	-0.008	4.500	0.004	-0.005	5.000	0.006	-0.008	0.003
(t + Δt)= 5,0	0.003													
		5.000	0.003	-0.004	5.000	0.003	-0.004	5.000	0.002	-0.002	0.000	0.003	-0.004	0.001

Amonium



C1 1 to
t^2 0 8

Danau	C (t) g/m³	W, g/hari	Q, m³/hari	V m³	H m	A m²	vs m/hari	k hari⁻¹	λ, hari⁻¹
S Baru 2	2 48	0	3381 408	15000	2	7500	0	0	0 7253272

mutal condition

1 0

c (t) c_{awal} g/m³

$c_1(t)$ 2 48 g/m³ $c_1(t+\Delta t)$ $c_1(t)$ + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) Δt

Steady

dc_1/dt $f(t, c_1(t))$ $-\lambda_1 c_1$

k_{11} $f(t, c(t))$ $-\lambda_1 c_1(t)$

k_{21} $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{11})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{11})$

k_{31} = $f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{21})$ $-\lambda_1 c_1$ $(t + 1/2\ \Delta t\ k_{...})$

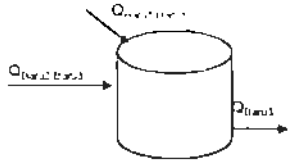
dt 0 5 hr

k_{41} = $f(t + \Delta t, c(t) + \Delta t k_{31})$ $-\lambda_1 c_1$ $(t + \Delta t\ k_{31})$

t 0

$c_1(t)$ 2 48

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t+\Delta t)$
1 0	2 48													
0 5		0 000	2 480	-0 559	0 250	2 340	-0 528	0 250	2 348	-0 529	0 500	2 215	-0 499	2 215648477
(t + Δt) 0,5	2 215648 48													
1 0		0 5	2 215648 48	-0 499	0 750	1 966	-0 443	0 750	2 105	-0 474	1 000	1 978	-0 446	1 989916976
(t + Δt)= 1,0	1 98391698													
1 5		1 0	1 98391698	-0 447	1 250	1 872	-0 422	1 250	1 878	-0 423	1 500	1 772	-0 400	1 772444607
(t + Δt)= 1,5	1 77244461													
2 0		1 5	1 77244461	-0 400	1 750	1 673	-0 377	1 750	1 678	-0 378	2 000	1 583	-0 357	1 583513788
(t + Δt)= 2,0	1 58351379													
2 5		2	1 58351379	-0 357	2 250	1 494	-0 337	2 250	1 499	-0 338	2 500	1 415	-0 319	1 414721739
(t + Δt)= 2 5	1 414721739													
3 0		2 5	1 41472174	-0 319	2 500	1 335	-0 301	2 500	1 339	-0 302	3 000	1 415	-0 319	1 261085583
(t + Δt)= 3,0	1 261085583													
3 5		3 0	1 26108558	-0 284	3 000	1 261	-0 284	3 000	1 190	-0 268	3 500	1 261	-0 284	1 121614301
(t + Δt)= 3,5	1 121614301													
4 0		3 5	1 1716143	-0 253	3 500	1 122	-0 253	3 500	1 058	-0 239	4 000	1 122	-0 253	0 997568013
(t + Δt)= 4,0	0 997568013													
4 5		4 0	0 99756801	-0 225	4 000	0 998	-0 225	4 000	0 941	-0 212	4 500	0 998	-0 225	0 887240774
(t + Δt)= 4,5	0 887240774													
5 0		4 5	0 88724077	-0 200	4 500	0 887	-0 200	4 500	0 837	-0 189	5 000	0 887	-0 200	0 789115309
(t + Δt)= 5 0	0 789115309													
		5 0	0 78911531	-0 178	5 000	0 789	-0 178	5 000	0 745	-0 168	0 000	0 789	-0 178	0 701841249



Danau	C (t) g/m³	W_i g/hari	Q_i m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_i hari⁻¹
S Baru 1	2 62	0	12092 2899	10000	2	5000	0	0	1 209
S Baru 2	2 48	0	3381 408	15000	2	7500	0	0	0 225
S Baru 3	2	0	15473 6979	18750	2 5	7500	0	0	0 825

dc_i/dt = W_i/V + $Q_{i-1}/V_i c_{i-1}$ + $Q_{out}/V_i c_{out}$ − $\lambda_i c_i$

dt 0 5

initial condition

t = 0

c (1) = c_{Baru1} g/m³

$c_i(t)$ = 2 g/m³

$c_i(t+\Delta t)$ = $c_i(t)$ + 1/6 (k_{i1} + 2k_{i2} + 2k_{i3} + k_{i4}) Δt

$k_{i1} = f(t, c(t))$ = W_i/V + $Q_{i-1}/V_i c_{i-1}$ + $Q_{out}/V_i c_{out}$ − $\lambda_i c_i$

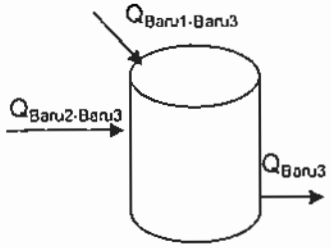
$k_{i2} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{i1})$ = $W_i/(t + 1/2\ \Delta t)$ − $\lambda_i c_i$ $(t + 1/2\ \Delta t\ k_{i1})$ + $Q_{i-1}/V_i c_{i-1}$ $(t + 1/2\ \Delta t\ k_{i1})$ − $Q_{out}/V_i c_{out}$ $(t + 1/2\ \Delta t\ k_{i1})$

$k_{i3} = f(t + 1/2\Delta t, c(t) + 1/2\Delta t k_{i2})$ = $W_i/(t + 1/2\ \Delta t)$ − $\lambda_i c_i$ $(t + 1/2\ \Delta t\ k_{i2})$ + $Q_{i-1}/V_i c_{i-1}$ $(t + 1/2\ \Delta t\ k_{i2})$ − $Q_{out}/V_i c_{out}$ $(t + 1/2\ \Delta t\ k_{i2})$

$k_{i4} = f(t + \Delta t, c(t) + \Delta t k_{i3})$ = $W_i/(t + \Delta t)$ − $\lambda_i c_i$ $(t + \Delta t\ k_{i3})$ + $Q_{i-1}/V_i c_{i-1}$ $(t + \Delta t\ k_{i3})$ − $Q_{out}/V_i c_{out}$ $(t + \Delta t\ k_{i3})$

Δt 0.5	$c_4(t)$	f		k_{14}	f		k_{24}	f		k_{34}	f		k_{44}	$c_4(t + \Delta t)$
t = 0	2 000													
0 5		0 000	2 000	2 077	0 250	2 519	0 665	0 250	2 184	1 242	0 500	2 621	-0 012	2 488715765
(t + Δt)=0,5	2 48821578													
1 0		0 5	2 488	-0 930	0 750	2 256	-0 739	0 750	2 303	0 098	1 000	2 538	-0 843	2 733257838
(t + Δt)= 1,0	2 23325784													
1 5		1 0	2 233	-1 127	1 250	1 951	-0 473	1 250	2 115	-0 512	1 500	1 977	-0 697	1 916938958
(t + Δt)= 1,5	1 91693896													
2 0		1 5	1 917	-1 142	1 750	1 631	-0 579	1 750	1 772	-0 642	2 000	1 596	-0 668	1 562481545
(t + Δt)= 2,0	1 56248155													
2 5		2	1 562	-1 005	2 250	1 311	-0 533	2 250	1 429	-0 601	2 500	1 282	-0 563	1 242910184
(t + Δt)= 2,5	1 24291018													
3 0		2 5	1 243	-0 831	2 750	1 035	-0 437	2 750	1 134	-0 502	3 000	0 992	-0 333	0 989343133
(t + Δt)= 3,0	0 98934313													
3 5		3	0 989	-0 660	3 250	0 819	-0 309	3 250	0 912	-0 477	3 500	0 776	-0 273	0 787280525
(t + Δt)= 3,5	0 78728052													
4 0		3 5	0 787	-0 548	3 750	0 650	-0 248	3 750	0 728	-0 334	4 000	0 620	-0 221	0 626420667
(t + Δt)= 4,0	0 62642067													
4 5		4	0 626	-0 436	4 250	0 517	-0 165	4 250	0 580	-0 255	4 500	0 498	-0 170	0 502626928
(t + Δt)= 4,5	0 50262693													
5 0		4 5	0 503	-0 347	4 750	0 416	-0 135	4 750	0 469	-0 193	5 000	0 406	-0 127	0 40607168
(t + Δt)= 5,0	0 40607168													
5 5		5	0 406	-0 279	5 250	0 339	-0 098	5 250	0 384	-0 148	5 500	0 335	-0 098	0 336434606
(t + Δt)= 5,1	0 33643461													
6 0		5 5	0 336	-0 278	5 750	0 267	-0 220	5 750	0 281	-0 232	6 000	0 220	-0 182	0 222719307
(t + Δt)= 5,2	0 2227194													
6 5		6	0 223	-0 184	6 250	0 177	-0 146	6 250	0 186	-0 154	6 500	0 148	-0 120	0 147440034
(t + Δt)= 5,3	0 14744003													
7 0		6 5	0 147	-0 122	6 750	0 117	-0 097	6 750	0 123	-0 102	7 000	0 097	-0 080	0 097605165
(t + Δt)= 5,4	0 09760517													
7 5		7	0 098	-0 081	7 250	0 077	-0 064	7 250	0 082	-0 067	7 500	0 064	-0 053	0 064814529
(t + Δt)= 5,5	0 06481453													
8 0		7 5	0 065	-0 053	7 750	0 051	-0 042	7 750	0 054	-0 045	8 000	0 042	-0 035	0 042774758
(t + Δt)= 5,6	0 04277476													
8 5		8	0 043	-0 035	8 250	0 034	-0 028	8 250	0 036	-0 030	8 500	0 028	-0 023	0 02831885
(t + Δt)= 5,7	0 02831885													

DO - 3



Danau	C (t) g/m³	W_1	Q_1 m³/hari	V m³	H m	A m²	v m/hari	k hari⁻¹	λ_1 hari⁻¹
S. Baru 1	2.72	0	12092.29	10000	2	5000	0.01	0.197	1.406
S. Baru 2	2.62	0	3381.41	20000	2	10000	0.01	0.197	0.366
S. Baru 3	5.96	0	15473.70	12500	2.5	5000	0.01	0.197	1.435

$dc_4/dt = W_4/V + Q_{14}/V_1 c_{14} + Q_{34}/V_3 c_{34} - \lambda_4 c_4$

$dt = 0.5$

initial condition

$t = 0$

$c(t) = c_{danau}$ g/m³

$c_4(1) = 5.96$ g/m³

$c_4(t + \Delta t) = c_4(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

$= W_3/V + Q_{14}/V_1 c_{14} + Q_{34}/V_3 c_{34} - \lambda_3 c_3$

$k_{14} = f(t, c(t))$

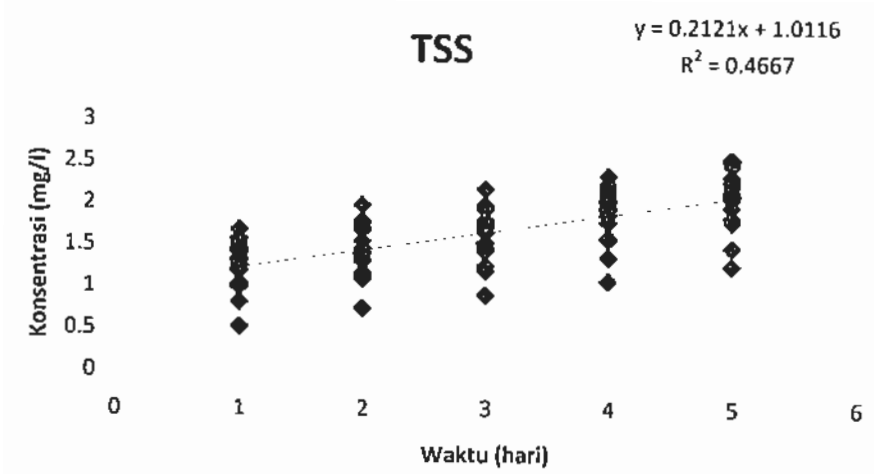
$k_{24} = f(t + 1/2\Delta t, c(t) + \ldots = W(t + 1. \ldots - \lambda_4 c_4 \ldots (t + 1/2 \Delta t\, k_{14}) + Q_{34}/V_3 c_{34}$

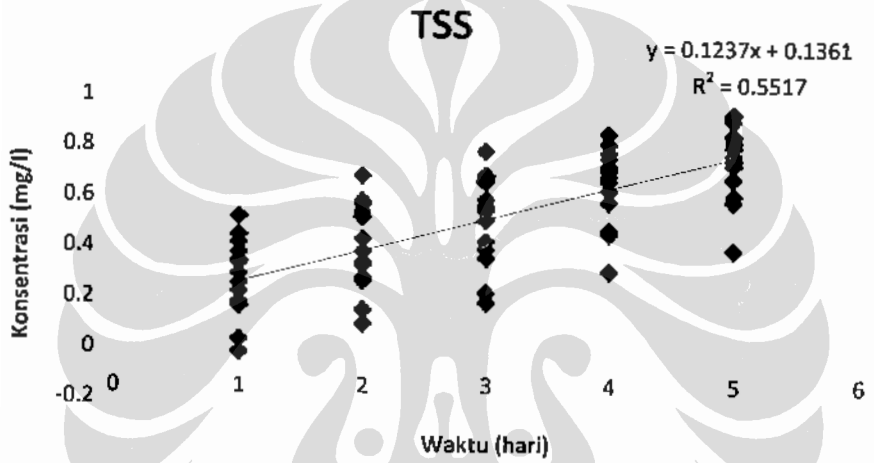
$Q_{14}/V_1 c \ldots (t + 1/2 \Delta t\, k_{14} \ldots (t + 1/2 \Delta t\, k_{14})$

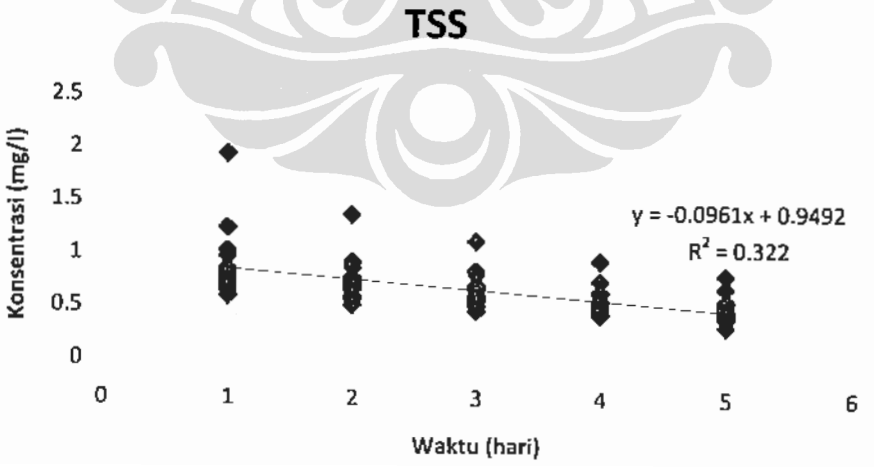
$k_{34} = f(t + 1/2\Delta t, c(t) + \ldots = W(t + 1. \ldots - \lambda_4 c_4 \ldots (t + 1/2 \Delta t\, k_{24}) + (t + 1/2 \Delta t\, k_{24} + Q_{34}/V_3 c_{34} \ldots (t + 1/2 \Delta t\, k_{24})$

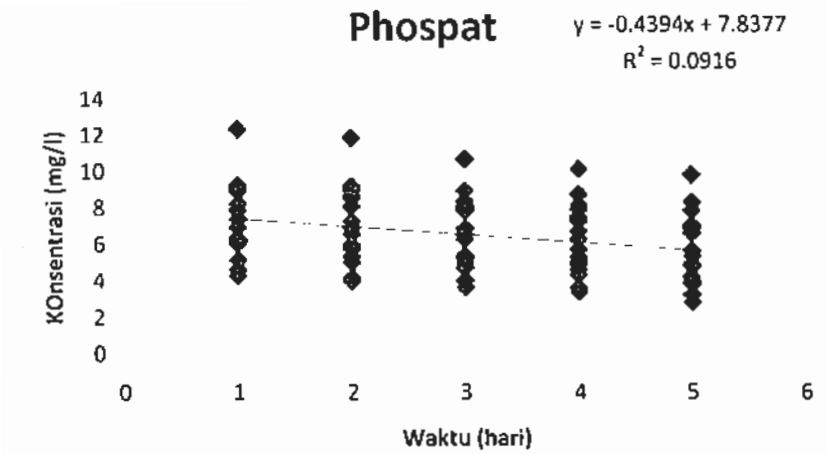
$k_{43} = f(t + \Delta t, c(t) + \Delta t \ldots = W(t + \Delta t \ldots - \lambda_4 c_4 \ldots (t + \Delta t\, k_{34})$

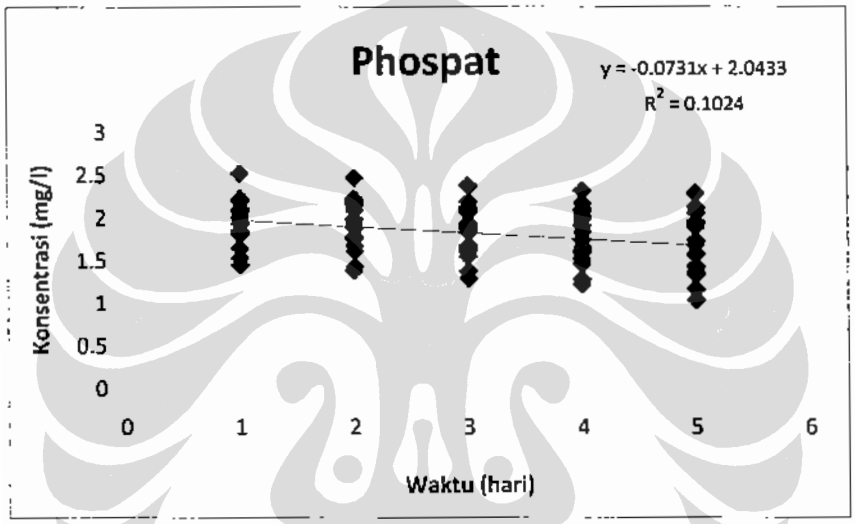
Δt: 0.5	$c_4(t)$	f		k_{14}	f		k_{24}	f		k_{34}	f		k_{44}	$c_4(t + \Delta t)$
t = 0	5.96													
0.5		0.00	5.96	-5.71	0.25	4.53	-3.89	0.25	4.99	-4.22	0.50	3.85	-3.66	3.83
(t + Δt)=0,5	3.83													
1.0		0.50	3.83	-4.50	0.75	2.70	-2.94	0.75	3.09	-2.63	1.00	2.51	-2.68	2.30
(t + Δt)= 1,0	2.30													
1.5		1.00	2.30	-2.71	1.25	1.62	-1.37	1.25	1.96	-1.80	1.50	1.40	-1.31	1.44
(t + Δt)= 1,5	1.44													
2.0		1.50	1.44	-1.74	1.75	1.00	-0.82	1.75	1.23	-1.15	2.00	0.86	-0.78	0.90
(t + Δt)= 2,0	0.90													
2.5		2.00	0.90	-1.10	2.25	0.62	-0.46	2.25	0.79	-0.71	2.50	0.54	-0.46	0.57
(t + Δt)= 2,5	0.57													
3.0		2.50	0.57	-0.71	2.75	0.40	-0.24	2.75	0.51	-0.44	3.00	0.35	-0.16	0.39
(t + Δt)= 3,0	0.39													
3.5		3.00	0.39	-0.48	3.25	0.27	-0.13	3.25	0.36	-0.29	3.50	0.24	-0.09	0.27
(t + Δt)= 3,5	0.27													
4.0		3.50	0.27	-0.34	3.75	0.19	-0.07	3.75	0.25	-0.19	4.00	0.18	-0.05	0.19
(t + Δt)= 4,0	0.19													
4.5		4.00	0.19	-0.24	4.25	0.13	-0.03	4.25	0.19	-0.12	4.50	0.13	-0.03	0.15
(t + Δt)= 4,5	0.15													
5.0		4.50	0.15	-0.18	4.75	0.10	0.00	4.75	0.15	-0.08	5.00	0.11	-0.01	0.12
(t + Δt)= 5,0	0.12													
		5.00	0.12	-0.15	5.25	0.08	0.01	5.25	0.12	-0.06	5.50	0.09	0.00	0.10

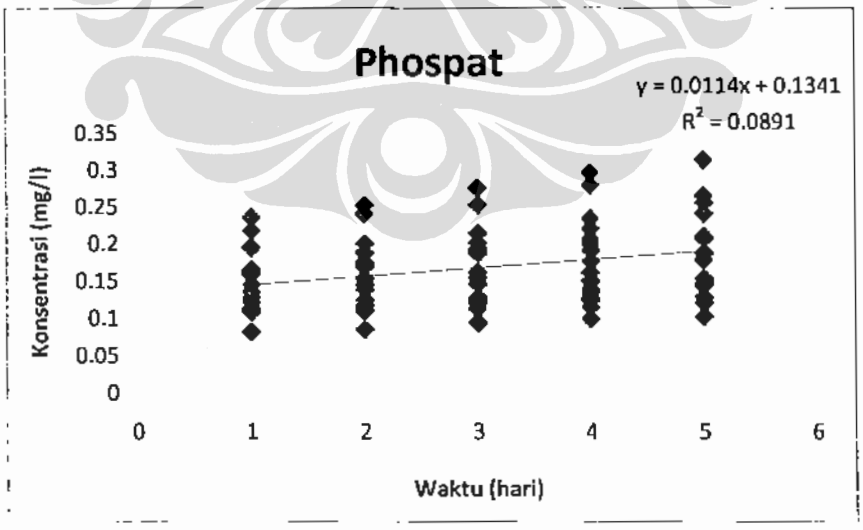

TSS
y = 0.2121x + 1.0116
R² = 0.4667
Konsentrasi (mg/l)
Waktu (hari)

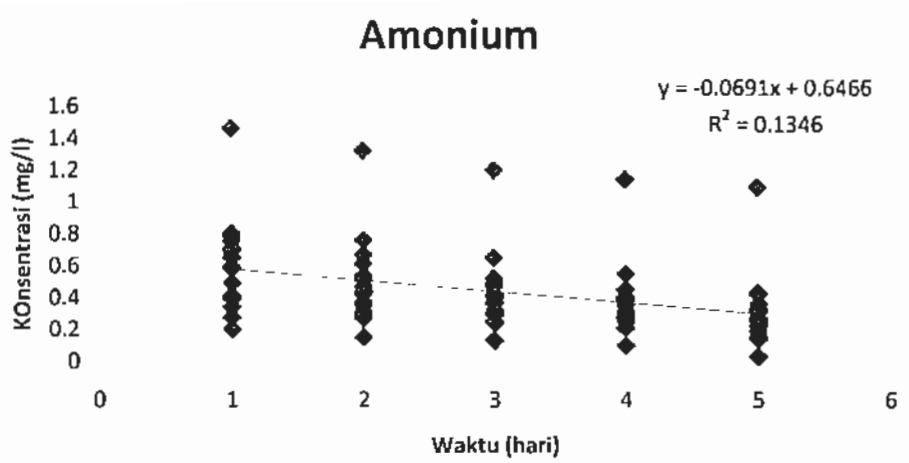

TSS
y = 0.1237x + 0.1361
R² = 0.5517
Konsentrasi (mg/l)
Waktu (hari)

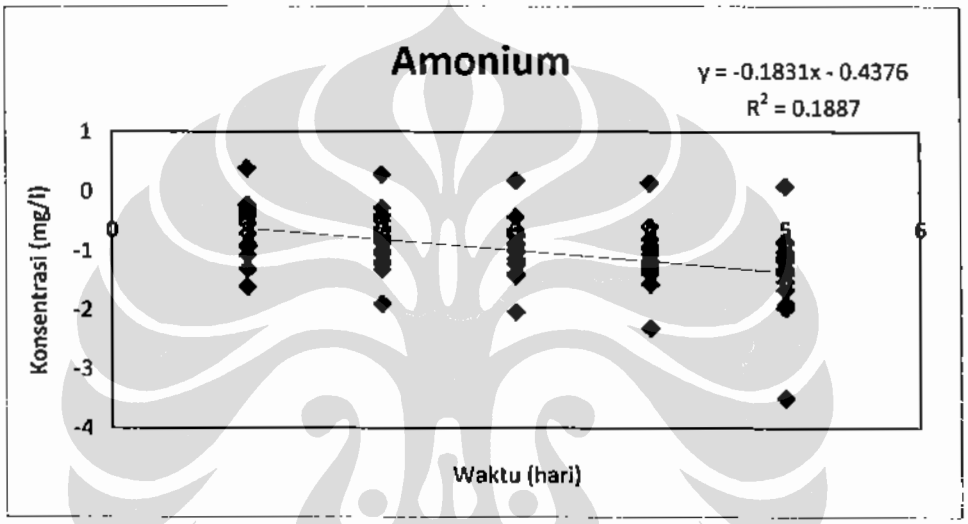

TSS
y = -0.0961x + 0.9492
R² = 0.322
Konsentrasi (mg/l)
Waktu (hari)

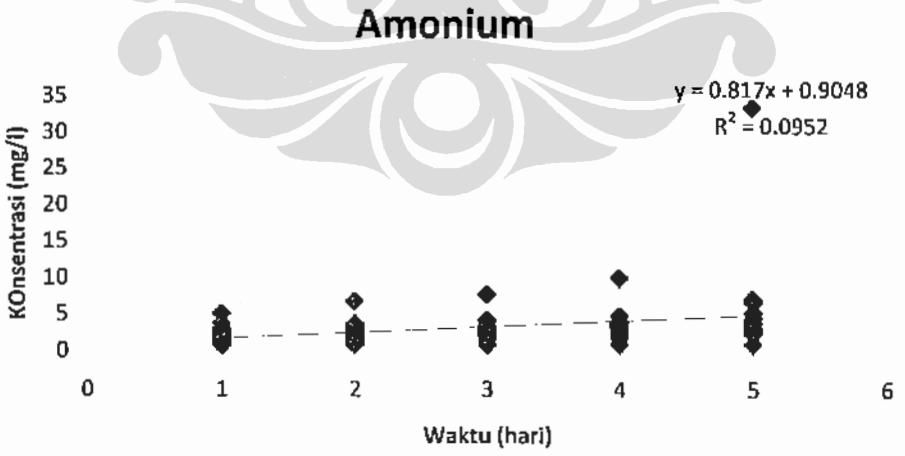

Phospat
y = -0.4394x + 7.8377
R² = 0.0916
KOnsentrasi (mg/l)
14
12
10
8
6
4
2
0
0 1 2 3 4 5 6
Waktu (hari)


Phospat
y = -0.0731x + 2.0433
R² = 0.1024
Konsentrasi (mg/l)
3
2.5
2
1.5
1
0.5
0
0 1 2 3 4 5 6
Waktu (hari)

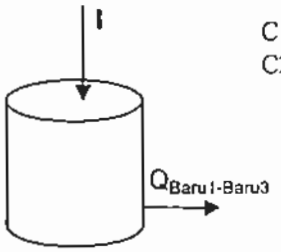

Phospat
y = 0.0114x + 0.1341
R² = 0.0891
Konsentrasi (mg/l)
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0 1 2 3 4 5 6
Waktu (hari)


Amonium
y = -0.0691x + 0.6466
R² = 0.1346
KOnsentrasi (mg/l)
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
0
1
2
3
4
5
6
Waktu (hari)


Amonium
y = -0.1831x - 0.4376
R² = 0.1887
Konsentrasi (mg/l)
1
0
-1
-2
-3
-4
0
6
Waktu (hari)


Amonium
y = 0.817x + 0.9048
R² = 0.0952
KOnsentrasi (mg/l)
35
30
25
20
15
10
5
0
0
1
2
3
4
5
6
Waktu (hari)

DO - 1



C1 1.46
C2 0.8

Danau	C (t) g/m³	W_i	Q_i m³/hari	V m³	H m	A m²	vs m/h	k hari⁻¹	λ_i hari⁻¹
S. Baru1	2.7	0	12092.29	10000	2	5000	0	0.2	1.411

initial condition

t = 0

$c(t) = c_{danau}$ g/m³

$c_1(t) = 2.7$ g/m³

$c_1(t + = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

= -

Steady $dc_1/dt = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) \quad \lambda_1 c_1(t)$

$k_{21} = f(t+ 1/2\Delta t, c(t)+1 = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1 = -\lambda_1 c_1 (t + 1/2 \Delta t\, k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_3 = -\lambda_1 c_1 (t + \Delta t\, k_{31})$

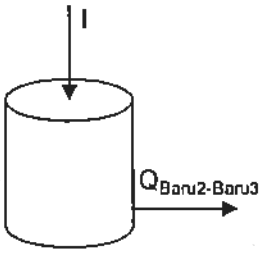
dt 0.5 hr

t 0

$c_1(t)$ 2.7

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	2.72													
0.5		0.00	2.72	-3.84	0.25	1.76	-2.48	0.25	2.10	-2.96	0.50	1.24	-1.75	1.35
(t + Δt)=0,5	1.35													
1.0		0.50	1.35	-1.90	0.75	0.40	-0.56	0.75	1.21	-1.70	1.00	0.50	-0.70	0.75
(t + Δt)= 1,0	0.75													
1.5		1.00	0.75	-1.06	1.25	0.49	-0.69	1.25	0.58	-0.82	1.50	0.34	-0.48	0.37
(t + Δt)= 1,5	0.37													
2.0		1.50	0.37	-0.53	1.75	0.24	-0.34	1.75	0.29	-0.41	2.00	0.17	-0.24	0.18
(t + Δt)= 2,0	0.18													
2.5		2.00	0.18	-0.26	2.25	0.12	-0.17	2.25	0.14	-0.20	2.50	0.08	-0.12	0.09
(t + Δt)= 2,5	0.09													
3.0		2.50	0.09	-0.13	2.50	0.06	-0.08	2.50	0.07	-0.10	3.00	0.09	-0.13	0.04
(t + Δt)= 3,0	0.04													
3.5		3.00	0.04	-0.06	3.00	0.04	-0.06	3.00	0.03	-0.04	3.50	0.04	-0.06	0.01
(t + Δt)= 3,5	0.01													
4.0		3.50	0.01	-0.02	3.50	0.01	-0.02	3.50	0.01	-0.01	4.00	0.01	-0.02	0.01
(t + Δt)= 4,0	0.01													
4.5		4.00	0.01	-0.01	4.00	0.01	-0.01	4.00	0.00	-0.01	4.50	0.01	-0.01	0.00
(t + Δt)= 4,5	0.00													
5.0		4.50	0.00	0.00	4.50	0.00	0.00	4.50	0.00	0.00	5.00	0.00	0.00	0.00
(t + Δt)= 5,0	0.00													
		5.00	0.00	0.00	5.00	0.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00

DO - 2



C1 1.46
C2 0.8

Danau	C(t) g/m³	W_i	Q_i m³/hari	V m³	H m	A m²	vs m/ha	k_2 hari⁻¹	λ_1 hari⁻¹
S.Baru 2	2.62	0	3381.41	20000	2	10000	0.01	0.2	0.371

initial condition

t = 0

c (t) = c_{danau} g/m³

$c_1(t)$ = 2.6 g/m³

$c_1(t + = c_1(t) + 1/6 (k_1 + 2k_2 + 2k_3 + k_4) \Delta t$

Steady

$dc_1/dt = -\lambda_1 c_1$

$k_{11} = f(t, c(t)) =$ -

$k_{21} = f(t+ 1/2\Delta t, c(t)+1/ = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{11})$

$k_{31} = f(t+ 1/2\Delta t, c(t)+1/ = -\lambda_1 c_1 (t + 1/2 \Delta t\ k_{21})$

$k_{41} = f(t+ \Delta t, c(t)+\Delta t k_{31} = -\lambda_1 c_1 (t + \Delta t\ k_{31})$

dt = 0.5 hr

t = 0

$c_1(t)$ = 2.6

Δt 0.5	$c_1(t)$	f_{11}		k_{11}	f_{21}		k_{21}	f_{31}		k_{31}	f_{41}		k_{41}	$c_1(t + \Delta t)$
t = 0	2.62													
0.5		0.00	-2.62	0.97	0.25	2.86	-1.06	0.25	2.35	-0.87	0.50	2.18	-0.81	2.31
(t + Δt)=0,5	2.31													
1.0		0.50	-2.31	0.86	0.75	2.74	-1.02	0.75	2.06	-0.76	1.00	1.93	-0.72	2.03
(t + Δt)= 1,0	2.03													
1.5		1.00	-2.03	0.75	1.25	2.21	-0.82	1.25	1.82	-0.68	1.50	1.69	-0.63	1.79
(t + Δt)= 1,5	1.79													
2.0		1.50	-1.79	0.66	1.75	1.95	-0.72	1.75	1.61	-0.60	2.00	1.49	-0.55	1.58
(t + Δt)= 2,0	1.58													
2.5		2.00	-1.58	0.58	2.25	1.72	-0.64	2.25	1.42	-0.53	2.50	1.31	-0.49	1.39
(t + Δt)= 2,5	1.39													
3.0		2.50	-1.39	0.52	2.50	1.52	-0.56	2.50	1.25	-0.46	3.00	1.39	-0.52	1.22
(t + Δt)= 3,0	1.22													
3.5		3.00	-1.22	0.45	3.00	1.22	-0.45	3.00	1.11	-0.41	3.50	1.22	-0.45	1.08
(t + Δt)= 3,5	1.08													
4.0		3.50	-1.08	0.40	3.50	1.08	-0.40	3.50	0.98	-0.36	4.00	1.08	-0.40	0.95
(t + Δt)= 4,0	0.95													
4.5		4.00	-0.95	0.35	4.00	0.95	-0.35	4.00	0.86	-0.32	4.50	0.95	-0.35	0.84
(t + Δt)= 4,5	0.84													
5.0		4.50	-0.84	0.31	4.50	0.84	-0.31	4.50	0.76	-0.28	5.00	0.84	-0.31	0.74
(t + Δt)= 5,0	0.74													
		5.00	-0.74	0.27	5.00	0.74	-0.27	5.00	0.67	-0.25	0.00	0.74	-0.27	0.65